

# Railway Age Gazette

Including the Railroad Gazette and the Railway Age

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E. A. SIMMONS, President.

L. B. SHERMAN, Vice-President.

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CLARENCE DEMING

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IT seems a long step from the activities of the early settlers in the West in offering every inducement to railways to build into their territory, to the efforts now being made by the railways to induce immigration into their territories, as typified by the land and industrial show which has just been held at New York. The show itself was in some respects like a great county fair, at which the pick of agricultural products from all parts of the United States are exhibited. Maine vied with Washington and Colorado in its display of potatoes. The apples of New York state were displayed across the aisle from the apples from Oregon. The opportunities and the agricultural possibilities of nearly every section of the country were "to advantage dressed." The broader meaning, however, of this great exhibit is the emphasis that it gives to the efforts that are being made by the railways of the entire country to develop an interest in agriculture along their lines; to introduce better methods of farming; and to help in the work of taking the immigrant out of the congested, unhealthy city and distributing him where he can do most good. Western roads, and especially land grant roads, were the original movers in this work. The eastern roads have followed suit; and now, as well illustrated by the land show, railways in every part of the country are making the industrial development of their territory a regular department of railroading. One of the companies which most recently entered this field is the New Haven, the work of whose industrial bureau is described in another column. Not only do the exhibits appeal to the desire of people to earn a substantial livelihood from farming, but they appeal to the imagination as well. The Great Northern, the Northern Pacific, the St. Paul and the Canadian Pacific all exhibit, beside products of the soil, pictures of the scenery in the territories in which they invite the home builder to settle. The exhibit indicates how closely the railways have co-operated with the government's department of agriculture in the movement to improve farming methods. It is also interesting to note, if we may draw general conclusions from a limited number of observations, how closely home to the farmer the railway company is able to get. The same farmer who throws away, without a second glance, a publication of the department of agriculture, will often drive ten miles to see a demonstration train showing the best breeds of cattle or the best methods for fertilization.

WILLIAM E. HARMON gave a lecture last week at Columbia University, in which he outlined a scheme of bringing labor and capital together by which "without destruction" he could "harmonize interests, neutralize antagonisms, and make the lion of industrialism and the lamb of organized capital pull the plow in double harness if the lion of labor does most of the work." He said that in brief his plan was to make the wage earner a capitalist and the capitalist, to a certain degree, his representative, pointing out that the president of the United States is the servant of all its citizens, and that the president of the United Steel Corporation is the representative of only 110,000 stockholders; the gross income of the United States Steel Corporation and the United States government being nearly equal. Mr. Harmon's idea is to form an American Mutual Investment Association which should sell securities to small investors, but, particularly, it should sell fractional interests in blocks of securities rather than specific securities. He illustrates this by assuming the selling capacity of the association in 1912 to be \$50,000,000, which would be made up of contracts running an average of, say, five years. At the end of 1912 these contracts would all be combined under the head "consolidated syndicate" of 1912, and thereafter, as this money is received at the rate of something less than \$10,000,000 a year, it would be invested in such securities as appealed to the trustees. The object of Mr. Harmon's plan is both to give the wage earner a more profitable form of investment than he now has, and to bring him so closely in touch with large corporate affairs that he would more fully sympathize with and understand the aims of large corporations and would also be a power in the management

of these corporations. In these two latter objects it would seem that Mr. Harmon's plan on the face of it fails. The wage earner who simply owned certificates of participation in a syndicate which owned stocks and bonds of railway and other corporations would be no nearer to the corporations themselves than is the depositor in a savings bank at present. It would be left to the trustees to decide what securities of what corporations to buy. The president of a corporation desiring to sell its securities to the Investment Association would have to appeal not to the general public, but to the trustees, and if he represented any interest, through the purchase of securities by the Investment Association, he would represent the interests of the trustees. This would be little, if any, different from the situation of the officer of a corporation which sold its securities largely to a life insurance company, and who represented the interest of those in control of the life insurance company, not of the holders of life insurance.

THE Special Committee on Relation of Railway Operation to Legislation has issued a report which we publish in another column, giving estimates of the cost of installing and maintaining automatic block signals on all the railway mileage of the country not now protected by such signals, and also of the cost of installing non-automatic signals on all the mileage not now protected by any scheme of signaling. Its figures, which are based on the experience of railways that already have installed signals, indicate that to equip with automatic signals all the mileage not now so protected would cost \$286,492,976, and that it would cost \$73,751,012 per year to maintain the additional signals, provide against their depreciation at the rate of 7 per cent. per year and pay 5 per cent. on the investment—which, of course, is as essential a part of the cost as either maintenance or depreciation. It is estimated that the cost of equipping with non-automatic signals the mileage not now so equipped would be \$58,721,600. The automatic signals already in use have been installed on lines of relatively heavy traffic, and on such lines installations cost more than where traffic is lighter. It seems probable, therefore, that the estimate of the cost of equipping the rest of the country's mileage with automatic signals is too high. However, even if the cost of installing automatic signals everywhere would be only \$1,000 a mile, it would be heavy—too heavy, in fact, to be justifiable. On many lines signals whose installation would involve a smaller initial cost would meet every need. If the committee's estimate as to the cost of automatic signals probably is too high, its estimate of the cost of non-automatic signals certainly is, as the bulletin indicates, too low, if under this heading are to be included only the better class of non-automatic systems. Probably it would cost nearer \$500 a mile than \$350—the figure given by the committee to provide controlled manual signals that will both facilitate and protect the handling of traffic. The committee gives no figures regarding the probable cost of maintaining and operating non-automatic signals, but it is well known that, owing to the much larger number of men that must be employed, the cost of operating them is much greater than the cost of operating automatic blocks. The committee's statistics are not an argument against the installation of block signals. The accident record of the railways of the United States is a conclusive argument in favor of a rapid increase in them. They are not even an argument against legislation to secure the installation of signals. They are, however, a most conclusive argument against legislation in whose enactment consideration is not given to the fact that the problem presented is one of finance as well as of safety. The federal government undoubtedly has the power and the right to so regulate railways as to increase safety. But it has no right, and probably it has not the power, to so regulate them without regard to the fact that improvements to increase safety cost money and lots of it, and that directly or indirectly the necessary money must come out of earnings. The statistics compiled by the committee, being based on actual past experience, reflect the financial phase of the situation to be dealt with more

accurately than any that heretofore have been available, and should receive due consideration from Congress when the subject of legislation to promote safety shall come before that body this winter.

THAT the Commerce Court refused to enjoin the Interstate Commerce Commission from enforcing its order prescribing a large number of reasonable maximum rates to Salt Lake City, and at the same time did temporarily enjoin the commission from enforcing its order requiring the railways to fix and maintain certain percentage relationships between their rates to the Pacific coast and to inter-mountain points, is probably significant. It seems to indicate that the court does not accept the commission's view that, under the law as amended by the Mann-Elkins act, it can compel the railways to base their rates to intermediate points on their rates to more distant points, when, as in these Pacific coast cases, it has been clearly shown and is conceded by the commission that the rates to the more distant points are controlled by water competition. The question involved is one of law. The commission has recognized that in the administration of the amended long and short haul clause it must be guided by other provisions of the interstate commerce act, which require its orders to be reasonable. The commission believes it is reasonable to require that the rates from eastern points of origin to intermediate points shall not be made more than certain percentages higher than those to the Pacific coast. The roads contend that this is not reasonable, because it would make it necessary, with every increase of water competition which pulled down rates to the coast, for them proportionately to reduce their rates to intermediate communities. The decisions of the Supreme Court under the original interstate commerce act indicate very strongly that it believes that any order requiring rates to intermediate points to be based on rates made to more distant points to meet water competition is inherently unreasonable, and the Commerce Court unquestionably will give great consideration to these decisions before it renders its final decision in the pending cases. Regardless of which way it decides, the litigation will be carried to the Supreme Court. This is not the first time that the Commerce Court has interfered with orders of the commission. It has entirely reversed it in several important cases. If because of this the public should be disposed to think that the court is applying the brake to the commission a little too hard, it should bear in mind that the commission itself is not a court, but an administrative body; that administrative bodies with the best of intentions, are apt to want to exercise more power than they possess, and are, therefore apt to conclude that they possess all the power they wish to exercise; and that it is as much the duty of the courts to define the authority of such bodies and keep them within proper limits as to give full effect to those of their orders which the courts shall find the law has authorized to be made.

THERE is an interesting, and perhaps significant, statement in the syllabus of the Interstate Commerce Commission's report in the case of *T. M. Sinclair & Co. v. Chicago, Milwaukee & St. Paul et al.* This statement is that, "The commission is without power to order an increase in any rate." For some reason, neither this statement nor its equivalent appears in the opinion proper; and, of course, a statement in a syllabus which does not appear in the accompanying opinion has no weight as a precedent, but it may be that this expresses the commission's view of its powers. In its report "In the Matter of the Request for Suspension of Reduced Rates on Packing House Products and Fresh Meats from Fort Worth, Tex., to Mississippi River Crossings and Points East Thereof," the commission held that it "has the power to suspend reductions in rates in any case where such suspension will operate to prevent unfair discrimination." This finding, when made, was accepted by some as committing the commission to the view that it has the authority



where discrimination is involved to prevent a reduction or to compel an advance. As we pointed out then, however, the Hepburn act gave the commission only the authority, when it found a rate unreasonable or unduly discriminatory, to fix a reasonable *maximum* rate, and the Mann-Elkins act gives it only the power after it has suspended a proposed change in rates "to make such order in reference to such rates as would be proper in a proceeding initiated after the rate had become effective." Obviously, therefore, the commission cannot issue a final order prohibiting a proposed reduction in a rate unless it can order an advance in it after it has gone into effect; and, as after it has gone into effect the commission can fix only a reasonable maximum rate, it seems to follow that it cannot either issue a final order to raise a rate already in effect or to prevent a reduction. The Mann-Elkins act does authorize the commission to suspend "any new individual or joint rate pending investigation of its reasonableness," and perhaps all the commission meant by its statement in the Fort Worth case was that, while it cannot make a final order to prevent a reduction in rates or compel an advance, it can suspend either an advance or a reduction pending investigation. This subject is of interest and importance because, if the commission can under existing law order either a reduction or an advance, it can in any case equitably remedy unfair discriminations; while if it can only order rates reduced, or prevent their advance, it can equitably correct and prevent discriminations only in the comparatively few cases where one or more of a number of existing or proposed related rates is found unreasonably high. It seems most probable that if the question were presented to them, the courts would hold the commission cannot now raise any rate or prevent its reduction. The quotation we have made from the Sinclair case indicates, as already has been said, that this is the commission's own view. In these circumstances an attempt should be made to get Congress to pass legislation specifically empowering and requiring the commission to raise rates or prevent their reduction when it thinks that this is the equitable way to correct or prevent an unfair discrimination. Such an attempt would be supported by every man who really believes in giving the railways a "square deal."

#### STEEL POSTAL CAR DESIGN.

THE recent conference of a committee of railway mechanical and mail traffic officers with a committee representing the post office department, regarding the construction of steel postal cars, is the beginning of a work which will have an important and far reaching influence, not only on the future design of postal cars, but on that of steel passenger cars in general. The postal car embodies nearly all the essential elements of construction which are found in passenger cars, except the inside finish, and the discussions and decisions relating to those essential elements must have a direct bearing on the design of all steel passenger cars.

The work has begun under favorable conditions with an intelligent outline by the post office department, covering very fully and in detail the questions of construction and equipment which it is desired to settle and the standards to be adopted, while the railways are represented by a committee of men who have had large experience in steel car design and are fairly representative of the roads using the various types of modern passenger car underframes. One of the chief benefits to be derived from these conferences is that the relative merits of the different types of steel underframes for passenger cars must come under review in serious discussion, which will not be merely academic, but must lead to the adoption of some type of construction. It is to be hoped it will result in some important improvements over existing plans. The exhibition of these various plans, and tests of their comparative resistance when submitted to competent engineering analysis, must show a wide diversity; some of them will be found manifestly too weak, while others may be found unnecessarily strong and heavy.

As the federal government is restricting railway earnings,

not only from freight traffic, but also from mail traffic, it cannot consistently require that any more dead weight shall be carried than is reasonably necessary for safety. The relation of weight to strength and stiffness in passenger train car construction must, therefore, receive rigid analysis. The impact due to heavy steel cars and large locomotives in collision is sufficient to destroy the ends of the strongest steel cars which have been built, as has been demonstrated by the behavior of the new steel Pullman cars, and the tendency is to add to the strength and increase the weight of the end platform and vestibule construction, thus adding to the overhanging load and increasing the tractive resistance of trains which are already too heavy for one very large locomotive to haul on ordinary schedules. There is scarcely any limit to which this tendency may be carried. It might be continued until we had passenger cars made of solid nickel steel oil tempered and strong enough to resist the impact of a shell from a 13 in. gun. By following the ordinary methods, and adding weight whenever lack of resistance is indicated by the result of collisions we might reach a point in the extravagant demand for safety where a 70 ft. car will weigh 100 tons. Four such cars would be the maximum that the most powerful steam locomotive could pull.

No other country has found it necessary to provide the margin of safety now found in the ordinary design of American steel passenger cars. The best foreign cars are very light, few of them weighing over 40 tons, and many of them, judged by American standards, being too weak for the fast schedules and heavy passenger traffic on European railways. This is demonstrated by the almost complete destruction of the car bodies when any extraordinary derailment or collision occurs on a European road. Here, then, we have two extremes, and American practice having already raised the weights of passenger equipment unreasonably, it should not be necessary to increase it further to meet imaginary requirements which may be brought out by the conferences of the railway experts with the postal authorities.

The action of very rigid, continuous, longitudinal members in an underframe in violent collisions has been such as to demonstrate that it is not the most desirable type of construction. Neither is the concentration of a rigid mass at the ends of the car now regarded as the best form of construction to safeguard the train as a whole, for in each case there is not sufficient movement of the mass to dissipate the energy of the blow, as it passes through the train, to a point where the underframe may not rise above that of another car and shear off the superstructure. A yielding resistance in each car will gradually cushion the blow and the total damage will be less, while the safety of the passenger has equivalent or greater protection.

The use of block signals is extending so rapidly that the danger from collisions is not such as to warrant the use of extra heavy cars to safeguard in case of an occasional casualty, but the risk of derailment is one which cannot be so easily guarded against, as it is often caused by the carelessness of the engineman in not reducing speed at turnouts and on curves. The lateral strength of the superstructure of the cars, and the stiffness of the sides and the roof, are, therefore, phases of the subject which should receive more attention, as longitudinal strength and stiffness have heretofore been regarded as paramount and, naturally, have been most liberally provided for. Stronger side construction would naturally take advantage of the use of the whole depth from the window sill to the side sill for a deep girder to carry the principal portion of the load, and this would reduce the size and weight of the center sills and provide the more flexible construction needed. Because of the side doors, the full benefit of this type of side frame cannot be realized in postal cars, and it would be necessary to raise the door sill and carry the side girder below the normal line of the car side. The new design for postal cars may, therefore, differ from existing types, but sufficient experience has been obtained from those types to furnish ample suggestions for the new type. The aim should be to develop a design which will furnish maxi-

mum strength and stiffness for a given weight; and there should be strong insistence that present weights shall not be exceeded. The future work of the postal car committee will be followed with unusual interest, as it will virtually establish standards for the framework of passenger equipment in general, as well as for many construction details and materials.

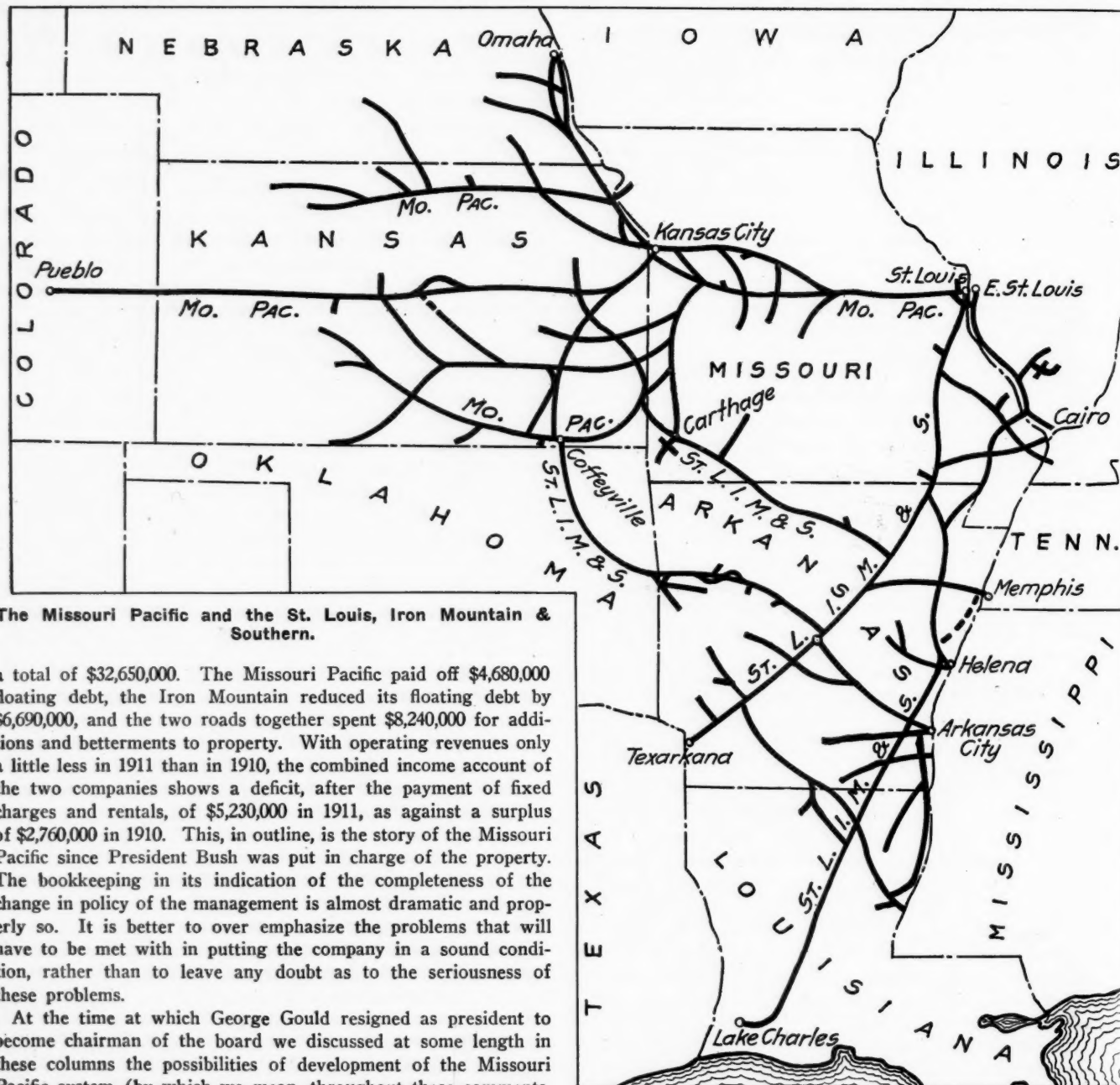
In the above we have principally considered the excessive weight of American passenger cars; and if the committee will use its influence in checking the continual increase in the weight of steel cars, its work, for this reason alone, will be of lasting benefit to the railways and the public.

#### MISSOURI PACIFIC.

**I**N the fiscal year ended June 30, 1911, the Missouri Pacific and the St. Louis, Iron Mountain & Southern together operated 7,235 miles. The Missouri Pacific increased its funded debt outstanding by \$19,760,000, and the Iron Mountain by \$12,890,000,

troubles were due to mistaken financial policies, to mistaken policies of upkeep and to absentee landlordism. The first annual report made by Mr. Bush strongly tends to confirm at least that part of the opinion which has to do with the troubles of the company in the past. While the very interesting question as to how completely President Bush has been given unlimited power in the management of the property can only be answered in the future, there has been nothing made public during the year that would lead one to suppose that his authority had been given with any string attached.

The deficit of over \$5,000,000 is directly accounted for by an increase of \$5,780,000 in expenses; and the facts that expenses of maintenance of way and structures increased by \$984,000, and the cost of maintenance of equipment by \$596,000, are pretty surely a sign of more healthy management. An increase of \$3-855,000 in transportation expenses, with a decrease in ton mileage carried, although with an increase in passenger mileage, needs



The Missouri Pacific and the St. Louis, Iron Mountain & Southern.

a total of \$32,650,000. The Missouri Pacific paid off \$4,680,000 floating debt, the Iron Mountain reduced its floating debt by \$6,690,000, and the two roads together spent \$8,240,000 for additions and betterments to property. With operating revenues only a little less in 1911 than in 1910, the combined income account of the two companies shows a deficit, after the payment of fixed charges and rentals, of \$5,230,000 in 1911, as against a surplus of \$2,760,000 in 1910. This, in outline, is the story of the Missouri Pacific since President Bush was put in charge of the property. The bookkeeping in its indication of the completeness of the change in policy of the management is almost dramatic and properly so. It is better to over emphasize the problems that will have to be met with in putting the company in a sound condition, rather than to leave any doubt as to the seriousness of these problems.

At the time at which George Gould resigned as president to become chairman of the board we discussed at some length in these columns the possibilities of development of the Missouri Pacific system (by which we mean, throughout these comments, the Missouri Pacific Railway and the St. Louis, Iron Mountain & Southern Railway), and at that time we expressed the opinion that the geographical position of the property, its terminal facilities and its traffic possibilities entitled it to rank, both from the point of view of a railway man and from that of an investor, very much higher than it now ranks; in other words, that its

some further explanation. Of course, an obvious enough explanation for part of this increase is the higher cost of labor and of fuel. Another explanation is that betterment of railway property made under traffic is likely to temporarily increase transportation costs. Certain increases, such as an increase from \$445,000 to \$989,000 for loss and damage to freight, and from



\$265,000 to \$903,000 for injuries to persons, are temporary and are quite possibly caused in good part by a new policy of settling these claims more promptly.

The mileage figures are not very full in the Missouri Pacific report, and especially, it may be mentioned, figures relating to locomotive mileage are for some reason omitted.

The total tons of revenue freight carried one mile amounted to 4,392,000,000 in 1911, a decrease of 6.5 per cent. from 1910; the total number of passengers carried one mile amounted to 488,000,000 last year, an increase of 6.2 per cent. over the year before. The passenger train mileage last year was 11,540,000, an increase of 5.3 per cent. over the year before, and the mileage of freight trains was 14,420,000, a decrease of 5.6 per cent. from the year before. The percentage of loaded car mileage to total car mileage was 71.5 in 1911 and 71.0 in 1910. The average train load of revenue freight in 1911 was 291 tons, or about three tons less than in 1910. There was 7 per cent. more company freight, however, in the train load, due probably to the betterment work that is being carried on. The Missouri Pacific gets a long average haul, although this haul was less by 3.2 miles in 1911 than in 1910. In 1911 the average was 225 miles. The average receipts per ton per mile last year were 8.5 mills, and per passenger per mile, 2.2 cents.

Of the total 19,490,000 tons of revenue freight carried last year, 22.1 per cent. was furnished by products of forests, 19.9 per cent. by manufactures and merchandise, 18.7 per cent. by agricultural products, 18.6 per cent. by miscellaneous freight, 16.6 per cent. by coal and coke, and 4.1 per cent. by animals and animal products. While the greater part of the Missouri Pacific's traffic is highly competitive, it is very diversified, and a quite extraordinarily small proportion of it is coal and coke, traffic that generally bears a low ton-mile rate. Furthermore, in 1911 there was a considerably larger proportion of lumber and of agricultural products carried than in 1910, while the proportion of coal and coke traffic to total tonnage was considerably less.

The accompanying map shows the geographical position of the Missouri Pacific, which, it may be pointed out again, includes the St. Louis, Iron Mountain & Southern, the two companies being operated as one system, although their financial exhibits are shown separately in the annual report. At St. Louis the Missouri Pacific has certain advantages in terminal facilities and traffic relations with some of the large shippers enjoyed by no one of its competitors. At Kansas City it has terminal facilities about equal to that of most of its competitors, and as part of a transcontinental route it delivers freight to the Denver & Rio Grande at Pueblo.

Of the \$8,240,000 previously mentioned as spent last year for betterment to the property, \$1,260,000 was spent for ballast, of which the road was badly in need; \$1,640,000 for additional main track; \$730,000 for terminal yards; \$860,000 for shops, engine houses and terminals; \$620,000 for bridges, trestles and culverts, and \$570,000 for increased weight of rail. For the first time there was 100-lb. rail laid on the Missouri Pacific system, 165 miles being laid on the St. Louis, Iron Mountain & Southern between Poplar Bluff, Mo., and Hoxie, Ark.; Lindsay, Ark., and Argenta, and Dumas, Ark., and McGehee. There were 235 miles of new 85-lb. rail laid on the system, and about 100 miles were relaid with 75, 63 and 60-lb. rail, replacing lighter rail. At the end of 1911, of the total 7,187 track miles, there were, besides the 165 miles of 100-lb. rail, 2,203 miles of 85-lb. rail, a few miles of 80-lb. rail, 1,243 miles of 75-lb. rail, some 70 and 65-lb. rail, 512 miles of 62-lb. rail, 429 miles of 60-lb. rail, 1,987 miles of 56-lb. rail, and 471 miles of 54 and 52-lb. rail. While there still must be a good deal of mileage that will have to be laid with heavier rail in the near future, the rail situation does not appear to be as bad as that of the ballast. In 1911 927 miles was ballasted with rock, 324 miles with gravel, 71 miles with cinders and 211 miles with chats. This is a great deal of ballasting work to be done in one year, and shows probably that the management is ballasting track just as quickly as it can be done economically. At the end of June 30, 1911, of the total mileage, 4,925 miles were

ballasted and 2,263 miles were unballasted. Of the ballasted track, on 313 miles rock has been used; on 2,113 gravel; on 998, cinders, and on 1,462, chats. The remaining 38 miles was ballasted with stone dust.

The policy of the management is well shown by the changes in the equipment account. During the year 69 locomotives were condemned and 74 added; 24 passenger train cars were retired and 40 added; and 1,163 freight train cars were retired and 2,042 added. For repairs of locomotives \$4,230,000 was spent in 1911, as against \$3,130,000 in 1910; \$650,000 was spent for repairs of passenger train cars, as against \$740,000 the year before; and \$2,350,000 was spent for repairs of freight train cars, as against \$3,060,000 in 1910. There was no depreciation charged on rolling stock in 1911, and only small sums were charged in 1910.

There is no combined balance sheet given for both the Missouri Pacific and the St. Louis, Iron Mountain & Southern. The Missouri Pacific, excluding the Iron Mountain, had at the end of 1911 \$2,630,000 cash, no floating debt, and total working liabilities of \$6,490,000. This compares with \$2,280,000 cash on hand at the end of 1910 and a floating debt of \$4,680,000, which is included in total working liabilities of \$9,210,000. The company, however, had \$30,160,000 marketable securities at the end of 1910, of which all but \$860,000 were disposed of the next year. The St. Louis, Iron Mountain & Southern had at the end of 1911 \$830,000 cash, owed the Missouri Pacific \$5,900,000, and had total working liabilities, including the debt to the M. P., of \$6,760,000. This compares with \$1,140,000 cash at the end of 1910; \$12,590,000 "miscellaneous accounts payable," which probably means in greater part debt to the M. P., and only \$190,000 other working liabilities. The cash position of the two companies is not strong, and financing by the Missouri Pacific is likely to be rather expensive; but this financing is only one of the problems of rehabilitating the property and, we may assume, a way of carrying it out was planned by the banking firm of Speyer & Company before it formed its present connection with the management.

The Missouri Pacific has \$20,000,000 5 per cent. 3-year notes falling due in 1914, secured by \$9,800,000 D. & R. G. preferred, \$15,000,000 D. & R. G. common, \$5,000,000 Texas & Pacific common, \$10,000,000 non-convertible first and refunding M. P. 5 per cent. bonds, and a 3-year 6 per cent. note of the St. Louis, Iron Mountain & Southern for \$8,500,000. The company has an authorized issue of \$175,000,000 first and refunding mortgage bonds, of which \$29,800,000 are outstanding.

The table shows the principal figures for 1911 and 1910:

	1911.	1910.
Average mileage operated.....	7,235	6,775
Freight revenue.....	\$37,629,213	\$38,201,784
Passenger revenue.....	10,917,851	10,210,358
Total operating revenue.....	52,776,593	53,019,137
Maint. of way and structures...	8,984,132	8,000,104
Maint. of equipment.....	8,283,521	7,687,429
Traffic.....	1,410,780	1,368,745
Transportation.....	22,745,409	18,889,986
Total operating expenses.....	43,329,936	37,547,372
Taxes.....	1,983,789	1,903,004
Net operating income.....	7,462,867	13,568,761
Gross corporate income.....	9,272,425	15,462,492
Net corporate income.....	5,232,539	2,759,411

\*Deficit.

#### NEW BOOKS.

*American Society for Testing Materials Year Book for 1911.* Secretary, Edgar Marburg, University of Pennsylvania, Philadelphia, Pa. Cloth, 6 in. x 9 in., 385 pages. Price \$5.

The year book of the American Society for Testing Materials for 1911 has just been issued. It contains, in addition to the regular specifications for iron and steel in various forms, quite a number of special specifications for railway details, such as steel rails, steel axles, steel tires, staybolt iron, locomotive cylinders and car wheels. The specifications for wood and cement are exceptionally complete. The book contains a list of the members and technical committees, and other information on the American society and the International Association for Testing Materials. The information about the latter is important, because the sixth congress of the International Association will be held in the United States during 1912.

## Letters to the Editor.

### D. A. D. AND THE SUPPLY DEPARTMENT.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

I note that "D. A. D." has handed in his rule book and keys, and left an opening on the run for some other fellow. I am not looking for the job, for after taking the through trip with his train of thought, I do not feel that I am big enough to hold it down. Furthermore, I have enjoyed the trip so much, and seen so much of which I approve, that it would be hypercritical to complain of the few low joints and slight jolts experienced on the way. At the same time, there are not many things in this world that look exactly the same when looked at from the East, as well as from the West.

D. A. D. has been rather severe on the supply department. I have never known a transportation officer who was not. I have been so myself many times. But I am still of the opinion that the supply man should look after supplies. It is true that the storekeeper will, if he is worth his wages, hold down his stock figures, compile his requisitions carefully, and often hand out material grudgingly. It is possible that he may even go a little too far along this line. But does the transportation and operating man never go too far? For instance, an ambitious assistant freight agent comes to the storekeeper to get two stoves to heat two palace horse cars that he has borrowed to carry loads that he has secured from a competitor. The value of these stoves equals two-thirds of the total revenue to be derived from the shipment. The storekeeper agrees to furnish the stoves at cost, and charge them to the proper account, but the agent does not want the amount to show, as it will make his little deal look like thirty cents. In fact, it will put a kink in his batting average, and he wants to keep that good even if his company must pay the price of admission. In the case cited the general manager, acting as umpire, rules the batter out; his batting is not winning the game.

To say that the division superintendent must beseech an underpaid storekeeper for fifty shovels in an emergency is surely a misnomer. In an emergency the storekeeper is more than thankful if his forethought has made it possible for him to hand out the shovels p. d. q. without waiting for any beseeching that will likely take the form of a wiggling, and the placing of a responsibility on him that his one-third salary would hardly justify him in assuming. The superintendent gets the shovels; surely he does; for are not all the resources of the railway behind him in an emergency? But does he bother his head about them when the line is clear for that apple of his eye, the Cannon Ball Limited, that may, or may not, pay the expense of running? Not so that you would notice it. He leaves them as beneath his dignity to look after. And that is one reason why so many people have railway shovels in their back yards.

Of course, fifty shovels—or their value—are a small item in an emergency. But why not give the storekeeper authority to order them back to the storehouse? He is a small-salaried man, paid for looking after small things, and he might save the amount of his own salary and a little bit of the superintendent's, if you would only let him follow out the mean bent of his nature. Why throw a brick at him if he gets it into his head, after fifteen or twenty years' hard work in handling material and supplies, that he is a little better qualified to do just that than the man who has never done it at all, and whose "heredity and environment" have inclined him to regard the supply department as the common enemy?

D. A. D. says, "The reformed user of material becomes the zealous consumer and protector;" and it must be true if he says so; but I have had no experience of these reformed gentlemen, so I cannot say. But why try to make a poor storekeeper out of a perfectly good superintendent, master mechanic, or other highly-paid official? The low-priced store department "Indian" we have

with us. Why not make full use of him? He often dreams that he, even he, is a small cog-wheel in the machine that manufactures that intangible commodity, "transportation," and that he does his best to see that the same is manufactured at a price that will leave his company a small profit should be no reproach.

If you will allow me, I would like to go further into this, when the rush season eases up a bit.

STOREKEEPER.

[We shall be glad to allow "Storekeeper" to go into the subject farther. The work of the supply department has not heretofore received as much attention and discussion as it deserves; and we should be glad to receive further communications regarding the problems it presents.—EDITOR.]

### THE DEVELOPMENT OF THE RAILWAY REGULATING COMMISSION IN ENGLAND.

BY W. M. ACWORTH.

In our Studies in Railway Economics\* we have seen that traders and the public are entitled to claim from the railways reasonable rates, reasonable facilities, and the avoidance of unreasonable preferences. But we have also seen, in the first place, that the question whether rates, facilities, and preferences are reasonable or unreasonable is a question of fact in the individual case, requiring for its decision the application of business and commercial considerations; and, in the second place, that as to the principle by which reasonableness should be judged there is no agreement as between one country or another, or even as between different members of the same country. We have further seen reason to think that the railway manager—let me once more explain that I use the word manager as personifying and embodying the experience and organization of the whole system—is himself the best qualified person to decide what is reasonable. For in knowledge and experience he is unquestionably pre-eminent, and he is certainly not less likely to be impartial than anybody else. But we have also agreed that he cannot possibly be allowed to decide without appeal, for that would be to permit him sometimes actually to decide, and very often to appear to be deciding, cases in which he is personally interested. And, further, the cases that come before him are of such wide and far-reaching public importance, involving, as they often do, the taking up of one trade or district, and the setting down of another, that no one, except a public authority representing the nation itself, is competent finally to pronounce on it.

Another point has emerged from our discussion of the subject; we have seen that in England, where the tribunal of appeal is a law court, the court finds itself constrained to adopt a narrow view of its functions of revision. It has expressly disclaimed any concern with prudence, with generosity, and even with commercial and economic motives, and we have concluded that, if this narrowing of the view by the exclusion of points, which would not merely weigh, but would weigh predominantly with the wise manager, is necessitated—as it surely is—by the very nature of law court procedure, the moral is that a law court is not what is wanted as a tribunal of appeal.

It is worth while going back into ancient railway history to see how we have reached our present position. English law has relied on two methods to protect the public. As against unreasonable rates, in themselves excessive, parliament has enacted, with a vast expenditure of trouble and in exceeding detail, a series of statutory maxima. They began even before the days of railways in the old canal acts; they were modified and codified by the provisional orders of the years 1891-1892. Most of us who have reached middle age can remember the ludicrous fiasco of the latest attempt. After studying the early history, President Hadley recorded in 1885 his conclusions in the following words:—"Every careful student of the question from Morrison in 1836 down to the committees of 1872 and 1882, has come to the conclusion that fixed maxima are of next to no use in preventing extortion." But the English Parliament, the English trader, and the English chambers of commerce, with

\**Railway Age Gazette*, Jan. 6, 1911, and following.



their contempt for the careful student and their belief in rule-of-thumb methods, paid no attention to a mere professor, and from 1885 to 1892 they spent, or caused to be spent, by the government, by the railway companies, and by the traders some hundreds of thousands of pounds in fixing a new series of maxima; and these maxima Parliament solemnly enacted as the rates which the railway companies should be "entitled"—as from January, 1893—"to charge and make." The railway companies, with a legal right which was unquestionable, and an unwisdom perhaps equally unquestionable, took their statutory powers seriously, and proceeded in some cases to exercise them to the full. And thereupon Parliament forthwith proceeded to eat its own words, to throw over for all practical purposes the new maxima worked out at enormous cost of time and money, and to enact that the maximum rates which the railway companies might charge should be, not the maxim of their new provisional orders, but the actual rates which they had been charging before those orders went into force. The statutory maxima still, however, remain in force for one purpose, namely, to tie the commissioner's hands and prevent them from authorizing the raising of rates in certain cases where it might be reasonable to do so. But at least we are entitled to hope that the theory of regulating railway rates by fixed maxima is finally dead. And, if one could only hope that the British public had learned by experience that the careful student sometimes understands things that are hid from the practical man, perhaps the price paid for the lesson would not have been too high.

But the fixing of maxima is only one side of public control. As early as 1845 the railway clauses consolidation act included among its provisions what is technically known as the equality clause, a clause which in substantially similar form had become common in private acts some years earlier. The equality clause in effect provides that, if all the circumstances are the same (distance, origin and destination, description, circumstances, etc.), rates shall be the same. Though it took about half a century before the fact was finally set at rest by a judgment of the House of Lords, the equality clause is only applicable in cases where all the circumstances are the same. And, in fact, they never are. So in 1854 the legislature went further, and enacted (if one may translate into ordinary language, the precise phraseology of a statute), that difference of treatment should be reasonably proportionate to difference of circumstance, that all traffic should be given reasonable facilities, and that no traffic should be subjected to any undue or unreasonable prejudice or disadvantage. By subsequent acts of 1873 and 1888 this Magna Charta of the railway customer has been extended and explained.

But to enact is one thing, to enforce another. The act of 1854 entrusted the enforcement of an ordinary law court, the court of common pleas, in spite of the protests of the judges that the matter was one which they were not qualified to deal with. And, indeed, Parliament itself appears to have had some sympathy with the judges, for it expressly provided that the court might employ engineers and barristers to conduct inquiries. Of this power the court does not appear ever to have availed itself. Their appreciation of their own limitations proved to be correct. There was a batch of litigation as soon as the act was passed; and then a lull; and before the general committee of the two houses in 1872 the traders' dissatisfaction with the tribunal was made evident. The upshot was the passing of a new act in 1873. The jurisdiction of the court of common pleas was taken away and transferred to a new railway commission. Throughout the act there is strong evidence of the desire of Parliament to get away from mere legality in the decision of railway questions. Two out of the three members of the commission (one of them being the chairman) were laymen, while the legal member had only the status of a judge of an inferior court. The commissioners were empowered to deal with complaints without requiring or permitting any formal proceedings. Assistant commissioners might also be appointed to make inquiries and reports, and, in some cases, to act as arbitrators; and the commission could call in besides the aid of assessors possessing technical

knowledge. The scheme broke down. Neither assistant commissioners nor assessors were, I believe, ever appointed. The attempt to deal with complaints without formal proceedings failed. The commission was a court, and a litigant could hardly be expected to open his heart to his judge. Moreover, the commission was not only a court, but an inferior court, and writs of *mandamus*, *certiorari*, and prohibition rained down upon it. It was more than once restrained from exceeding its jurisdiction.\* Proceedings before it tended not only to be ineffective, but actually, as almost every case was appealed, to be more rather than less expensive than before.

Once more the dissatisfaction of the traders led to a change in the law. If the commission was to be a court at all, it was evidently not enough of a court. So the act of 1888 provided for a new commission which is a court of record with all the powers, rights and privileges of a superior court. The two lay members are retained, but the third member is a judge of the high court. He presides, and his judgment on any point, which in the opinion of the commissioners is a point of law, is to prevail. Since 1888 the status of the commission court is sufficiently established. There have been but few appeals and they have been seldom successful. But the traders are still not satisfied. The procedure, they complain, is too expensive and too legal and technical. A report of the board of trade departmental committee of railway agreements and amalgamations, published within the last few months,† accordingly recommends that complaints should be decided on broad commercial considerations, and not in any narrow or technical manner, and that cases, where the amount in dispute is small, should be tried by the registrar, and not by the commission itself. Unfortunately a case which means 6s. 8d. to a trader may imply a principle involving thousands of pounds to a railway company. Unfortunately, too, the committee fails to indicate how the broad commercial considerations are to be brought within the scope of legal procedure, and how the court is to give effect to them. It would be about equally practical to suggest that an operating surgeon should recognize the importance of moral considerations.

The act of 1888 contains another provision, commonly known as the conciliation clause, which should be mentioned in this connection. This clause in effect provides that if any trader thinks he is being treated by a railway company in an unreasonable or oppressive manner, he may complain to the Board of Trade; and that board shall thereupon call on the company for an explanation, and endeavor amicably to settle the difference. The board is empowered to appoint any competent outsider to conduct the proceedings, but, so far as I am aware, this power has never been exercised. In practice, if correspondence fails to adjust the difference, the parties are brought face to face across a table at the Board of Trade office with one of the principal officers of the board in the chair. The procedure has undoubtedly met with a considerable measure of success, greater perhaps where the presiding officer has expressed his own opinions on the merits of the dispute, than where, as in other cases, he has confined himself to a position of mere neutrality. But the weakness of the procedure lies in the fact that it can only deal with the points that do not matter. The Board of Trade can only express an opinion, and, accordingly cases of any importance have to come before the railway commission. And with this in prospect it can hardly be expected that the defendants will disclose their case to their opponents prematurely.

The procedure of the Board of Trade was avowedly borrowed from the Massachusetts state railway commission. I venture to think that it has been spoiled in the borrowing, and that, with no change of the law, it might be made very much more useful than at present, if the Massachusetts commission procedure were more faithfully followed. The Massachusetts commission sits in public, makes its decision public, and relies on public

\*No one familiar with American history in this matter can help noticing the apparent jealousy of the American courts at the intrusion of railway commissions, both state and federal (bodies partly executive, partly legislative, and partly judicial), within their domain. The attitude of the English courts towards the commission of 1873 sometimes looked as if it was tinged with the same feeling.

opinion for its enforcement. And on any great institution as much open to be shot at as a railway company, public opinion can usually enforce any reasonable decision. The Board of Trade tribunal sits in private, expresses its opinion, where it expresses an opinion at all, privately to the parties, and decently enters a purely formal record of the proceedings in a parliamentary report a year or 18 months afterwards.

#### TEXAS COMMERCIAL SECRETARIES ON THE TEXAS RAILWAY SITUATION.

Because of the stringent policy of railway regulation that long has obtained in Texas the railway situation in that state is always of special interest. That the sentiment is becoming widespread among the leaders of thought and business in the state that the state's railway policy is having disastrous results for its people and ought to be radically changed is shown by resolutions which recently were adopted by the Commercial Secretaries and Business Men's Association of Texas at its recent meeting at Dallas. That part of the resolutions relating to railways should have interest and significance for people in another state where a policy of dealing with railways after the Texas fashion is advocated, and is therefore reprinted hereafter in full:

"Railroading in Texas, so far as that term implies the promotion of new projects and the construction of new lines, is on its last legs, if not absolutely dead. People build railways, like everything else, to make money. For a number of years the railway companies of Texas, taken in the aggregate, have earned an average income of about 3 per cent. on the money invested. Nobody in Texas, or anywhere else, in the United States, wants to invest his money at 3 per cent.

"In general, Texas railway rates, if compared with similar rates in other states, are higher. The revenue collected by Texas railways on Texas traffic per ton mile, is about 25 per cent. higher than the average for all lines in the United States. But this favorable factor is more than offset by expensive conditions for maintenance of way and structures and by legal requirements, which run the annual expense of operating the railways in Texas up to about 75 per cent. of gross earnings, as against an average of about 63 per cent. throughout the United States. This discrepancy represented about \$12,000,000 on the business of the Texas railways for the fiscal year ending June 30, 1911.

"We hold that the welfare of the state of Texas absolutely demands the further and rapid construction of railways. The mileage now existing in the state is, of course, fairly efficient to transport to the markets the products of the territories intersected by the same, which territories, however, constitute only a minor portion of the state's area. Production, of course, is limited in the main to the area served by the existing railways. We hold it to be the duty of the present generation to urge forward the construction of transportation lines in those undeveloped areas of the state, just as it was the duty and the work of our fathers and grandfathers to stimulate that railway development which now exists in the state, the benefits of which are being reaped by the present generation.

"We can see no reason why Texas should not aspire to development, keeping abreast of the development which has occurred in other states the settlement of which began about the same time as in Texas, such, for instance, as Illinois. But Texas, to attain a development corresponding with that of Illinois at this time, must, of course, enjoy public highways, by which is meant railways, for the transportation of the people and their products, to correspond with the transportation facilities of Illinois. In Texas today there is only one track mile of railway for each 19 square miles of territory, whereas in Illinois today there is one track mile of railway for each 4.6 square miles of territory, which is to say that before Texas can reasonably expect to attain a stage of development

comparing favorably with that of Illinois at this time, she must, of course, increase her mileage four times or to 55,143 miles, an increase over the present mileage of 41,357 miles. Indicative of the effect of such abundant transportation facilities is to be noted that whereas the population of Texas by the last census averaged only one person for each 43 square acres of land, the population of Illinois averaged one person for each 6.3 acres.

"We do not believe that under existing circumstances in view of the high return earned by money invested in other lines of business the amount of money required to construct this additional mileage, or to construct any considerable additional mileage, can be attracted into such investment. The prospect of receiving 3, 4 or even 5 per cent. from a railway investment as a maximum of net return, and realizable only after the railway has been carried as an entirely profitless investment through the first several years of its construction and operation, is inadequate to entice the investment of new capital in a country, where according to statistics, the same money, if intelligently invested in manufactures will earn 17 per cent., in agriculture will earn 9 per cent., and in banking from 10 to 30 per cent.

"There have been instances where large sums of money have been invested in railways with the foreknowledge that the ultimate settled return on the capitalization would represent a low rate per cent. upon the aggregate of the securities sold, the investment being made, nevertheless, because of speculative features pertaining to the construction. It was the element of speculation, afforded by heavy land grants, and other such considerations, that in the early history of railroading in this state, when it was yet almost a wilderness, induced railway construction with such rapidity as likely will never again be witnessed in our history. But the present situation in Texas is such that the element of speculation, which still enters into almost all enterprises of every other character, is eliminated from railway construction. The stock and bond law of the state is so worded as to admit of the adopted interpretation which forbids the issuance of the securities of railway companies for an amount in excess of that valuation placed on the physical property by the railway commission, making no allowance for the fact that the new securities on a new railway cannot be sold at par. A glance at the list of securities of the principal railways of the country as quoted on the various exchanges, will disclose that the securities of many of the best old railways in the country are not even yet selling at par. The same law is so drafted that few of the existing railways of the state are permitted to issue and sell securities to obtain money for badly needed permanent improvements to be made on their lines.

"The people of Texas at large should come to understand that there is no relevancy between the amount of stocks and bonds of a railway outstanding and the rates chargeable by the railways for the transportation of freight and passengers, and therefore that the theory upon which our stocks and bond law was passed was a mistaken one and that in so far as the stock and bond law is hindering the financing or construction of new railways, or of betterments to old roads, it is not only idle and useless, but is a detriment to the best interests of the state.

"In the face of this situation, which is to say, the assurance that the average income will not exceed 3 per cent. on the established railways, and with all speculative features of profit in connection with the construction of new lines eliminated, we perceive, under existing circumstances, little prospect for a material increase in the railway mileage of the state.

"Some of the larger defects in our railway laws or in the application of same, are obvious. The railway commission of the state, charged with the duty of fixing a valuation on the railways of the state for limiting the issuance of securities and on which we predicate the freight and passenger tariffs which the roads are allowed to charge, at the close of the fiscal year



ending June 30, 1909, the last date for which the figures are available, values all of the railways of the state, being 12,487 miles, with all of their equipment, at only \$212,794,585, or at the rate of \$16,560 per mile. For the same year the state tax board assessed the value of the same properties at over \$400,000,000, and they actually went on the tax rolls and paid taxes to the state on a valuation of \$326,684,908, or at the rate of \$25,425 per mile. Notwithstanding the shocking discrepancy between these figures in favor of the valuation made for the purposes of assessment, it is well known that neither valuation approximates correctness. The roads are bound by law, and even more by the rules of business, to keep and have kept their capital accounts showing their total disbursements for road and equipment. Their sworn reports indicate an actual cash disbursement to June 30, 1909, of \$515,211,981, or an average of \$40,100 per mile. While the cost of a railway does not necessarily represent its value, it is rarely the case that it is worth less at any time than its original cost. The valuation on the main body of the Texas railways was made by the railway commission in 1894 and 1895, which will be remembered as a period of general depression, and when in fact the railways of the state as a rule were in poor condition. A defect in the law fails to make provision for a revaluation at any time, and after the lapse of seventeen years everything in Texas has experienced remarkable enhancement except the commission's valuation of the railways, which according to the present law once fixed, is fixed for eternity.

"The rule laid down by the Supreme Court of the United States that railways are entitled to earn a fair return on the present value of their plants utilized in the public service, compels all courts to ignore the 1894 and 1895 valuation of the Texas railways, and it today is obsolete and ineffective except as regards the issuance of stock and bonds. In this connection it is calculated to perform and is performing a deadly and disastrous service. The principal roads of the state of Texas were constructed many years ago, at a time and under circumstances when railway companies in Texas were allowed by our law the same liberty of contract in financing their projects that was then universal, and still is practically universal elsewhere. For the purpose of constructing Texas railways there were issued and sold, and there now remain outstanding securities not including equipment trust obligations to the amount of about \$32,100 per mile. The reasonableness of this capitalization must be conceded when compared with the average per mile prevailing on all of the railways of the United States, which is over \$60,000 per mile. However, many years have now passed and many series of bonds issued in early days to get the money wherewith to build the Texas railways (at a time when Texas was almost frontier and needed railways as the very foundation for the construction of its new civilization), and which bonds were purchased in good faith and are now distributed into the hands of innumerable persons throughout this country and in Europe, are about to mature. It goes without saying that the railways have not been able to earn and set by a sufficient fund to pay any part of the principal of these obligations. Elsewhere than in Texas the matter of refunding same with a new mortgage and a new series of refunding bonds sufficient in amount to cover the principal of the bonds redeemed, although probably carrying a lower rate of interest, would be the natural and easy recourse of the railways; but, treating all of the railways of the state as a whole, it will be perceived that there is a discrepancy between the railway commission's valuation for stock and bond purposes of \$16,560 per mile, and the amount of stocks and bonds outstanding, to the extent of \$15,540 per mile. Any new mortgage executed upon these properties for the purpose of refunding these old maturing securities, being limited by the provisions of our stock and bond law, would therefore fall \$15,540 per mile short of sufficing to refund and redeem these old issues of securities sold by Texas

railways and now held in good faith by innumerable persons at the money centers of this and other countries.

"A repudiation of these obligations brought about thuswise by public statute, will strike a blow at the credit of all enterprises projected in this state sought to be financed without the state, that will stagger their credit for half a century. It will amount to confiscation of property running into many millions of dollars. It will be the final *coup de grace* to all projects for new railway construction, and it will not add one penny to the wealth of the state nor save one penny to any shipper or passenger using the railways of the state. The railway commission will not thereby be enabled to revise a single tariff downward. Those tariffs must be made with reference to the value of the property, and if the attempt were made to readjust them on the basis of any issue of securities so artificially diminished, the courts either of the state or of our nation would speedily restrain any such attempt. The honest citizenship of Texas, we are sure, has no desire to either aid or force the railway companies to repudiate bonds sold in good faith by a previous generation and now held in good faith by many creditors. It doubtless is true that many of these obligations were sold at less than par. Our railways then were new ventures of doubtful success; and, moreover, railway construction was then going forward throughout the entire United States, and competition for the necessary money to build them was keen. Results from the operations of the Texas railways since their construction, in general exemplify that where any purchaser of these original bond issues bargained to buy them at less than par he was not exercising undue prudence concerning his investment.

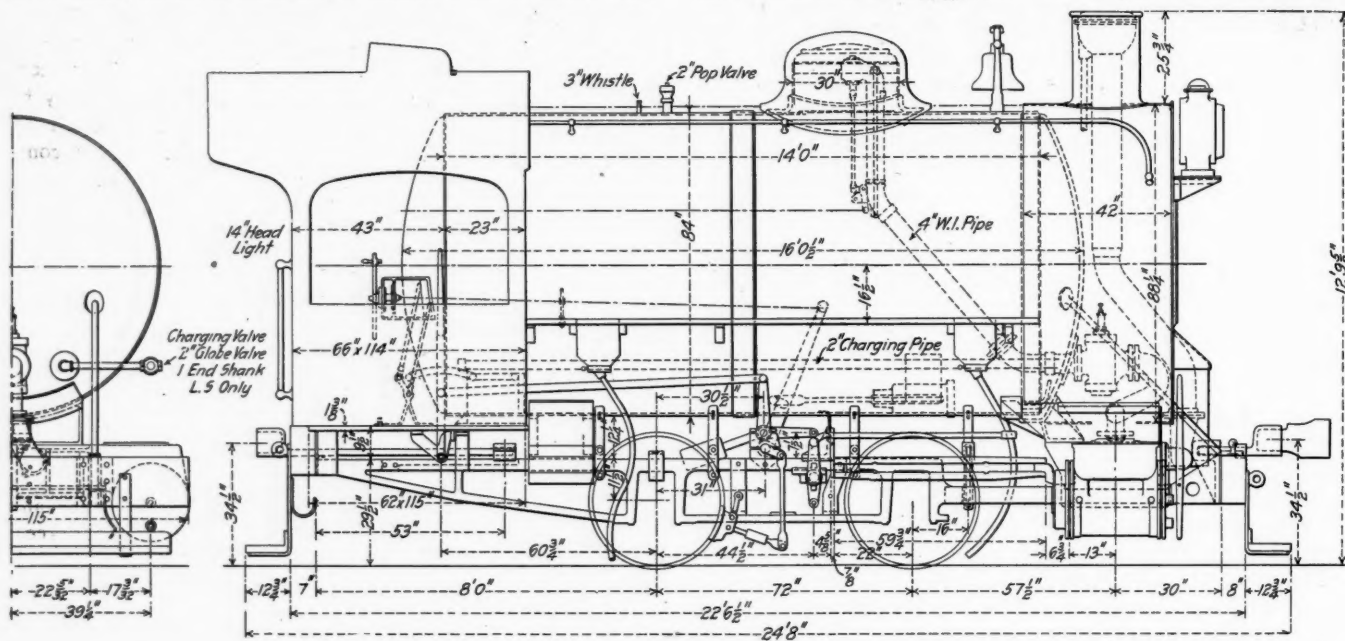
"We think these conditions should be rectified, not merely as a matter of justice to the railways but regarding the problem from the standpoint of men patriotically concerned for the state's further development. We believe that it would be wise for the public commission, the appointment of which is hereinafter recommended, to take into consideration the situation of the state with reference to its railways; that this commission hear parties at interest concerning the present situation; scrutinize the state's existing statutes and determine whether it would be practicable for the people of the state, through their legislature to so revise the railway laws, as again to stimulate and induce the construction of new railways and the betterment of existing railways on an extensive scale. The idea underlying this suggestion is: that within our observation all attempts made in this state during the last decade for construction of independent railway mileage, have almost invariably resulted in disaster to those attempting same; that the owners of the existing system lines have practically discontinued railway construction and are limiting all betterments to their properties to the minimum. All inquiries concerning the reason for such disasters to independent lines and for such policy on the part of system lines, lead to references concerning our statutes.

"The question to be studied is, does the state gain from those statutes such benefits in respect of control and regulation of existing railways as to compensate it for the discontinuation of railway construction? If so, it will, of course, be the part of wisdom for the state to adhere to its entire system of railway laws, many of which date back to the early days of railroading in the state, and some of which are palpably obsolete, just as they stand. If not, then it would be the part of wisdom for the state to ascertain what modifications of those laws would induce new construction; and if such modifications were found not inconsistent with the substantial welfare of the state as it now exists as regards the railways that now exist to adopt same, with the view not merely of producing an increased railway mileage, but of securing the great increase of development, production, population and wealth which invariably follow in the territory intersected by new railways."

**FIRELESS LOCOMOTIVE.**

Fireless, or steam storage, locomotives are practically unknown in this country, although they have been used extensively abroad, especially in logging camps. The advantages of this type of locomotive are its safety from starting fires; simplicity; economy in first cost over locomotives using storage batteries or compressed air; economy in the maintenance of boilers, since no boiler wash-

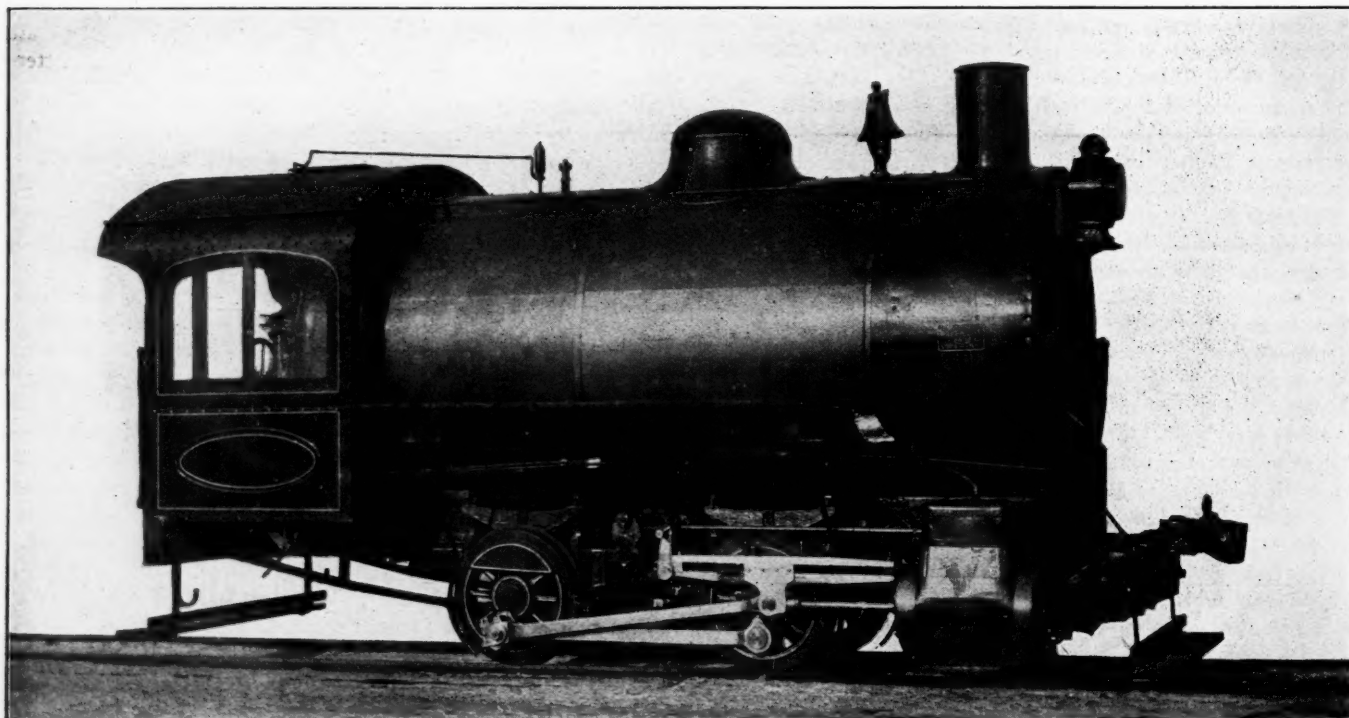
The Lima Locomotive and Machine Company, Lima, Ohio, has recently built one of these locomotives for the National Cash Register Company. The boiler is 84 in. in diameter, 16 ft. in length, and has a capacity of 530 cu. ft. It stores steam at a pressure of 155 lbs.; this is fed to the cylinders through a reducing valve at a pressure of 60 lbs. The tank is filled about half full of water and is then connected with a stationary boiler until the pressure equalizes. When this occurs, considerable steam



Steam Storage Locomotive.

ing is required and there are no deteriorating effects due to extreme heat; and economy in operation. Only one man is required to operate the locomotive. The steam is generated in the power house of the plant at which the locomotive is used, and if the locomotive is charged while the plant is shut down, before starting up in the morning or during the noon hour, the steam used will not interfere with the operation of the power house. The loss due to radiation is slight, being only 3 to 4 lbs. per hour.

will have been condensed and the water will have been raised to nearly the pressure and temperature of the steam in the boiler. As the steam is used the pressure falls, causing part of the water to change to steam. Under ordinary conditions the boiler will not have to be charged any oftener than the regular type of locomotive takes water. It will run from two or ten hours with one charge, varying with the amount of work done, two charges per day being a good average.



Steam Storage Locomotive for the National Cash Register Company.



The cylinders are 18 in. in diameter and the stroke is 18 in. long; the diameter of drivers is 36 in., giving a tractive effort of 9,720 lbs. Due to the large cylinders the engine will move itself with only 3 or 4 lbs. pressure per sq. in. in the cylinders. The total weight in working order is 77,100 lbs., giving a factor of adhesion of 7.94. As the steam is used and the weight decreases this factor reduces to about 5.6. The driving wheel centers are made of cast iron and are 30 in. in diameter; the journals are 6 in. x 7 in.

The locomotive has a length over bumpers of 22 ft. 6½ in. and is 12 ft. 9½ in. high. It is similar to the fireless locomotives made at the works of A. Borsig, Tegel, Germany, and described in the *Railway Age Gazette* of July 10, 1908, page 468. It is heavier, however, by some 7,000 lbs., and has its cylinders located at the front, instead of the rear as in the German design. The tractive effort is 2,100 lbs. greater than any of the German locomotives mentioned in the article. However, the storage pressure carried by them is 180 lbs., or 25 lbs. greater than the American engine.

### COST OF INSTALLING AND MAINTAINING BLOCK SIGNALS ON ALL AMERICAN RAILWAYS.

The Special Committee on Relations of Railway Operation to Legislation has issued the following bulletin, dated November 14:

On July 25 Circular No. 19 was issued, asking the railways for certain information with regard to installation of block signals, both automatic and non-automatic. Replies have been received from railways operating 85.2 per cent. of the total miles of track equipped with automatic block signals and 74.2 per cent. of the total miles of track equipped with non-automatic block signals. (See Table No. 1).

As a result of the information furnished, the details of which are given in tables 2 to 6, inclusive, the following is apparent:

Estimated cost of installation of automatic block signals on railway mileage not equipped .....	\$286,492,976
Estimated annual cost of maintenance .....	\$39,271,855
Estimated annual depreciation at 7 per cent. ....	20,054,508
Estimated annual interest charge at 5 per cent. ....	14,324,649

Total annual cost ..... \$73,751,012

It is also apparent that to equip with non-automatic block signals the mileage not now equipped will cost approximately \$58,721,600. This latter figure should be accepted with great caution, in view of the great variety of devices included under the general term "non-automatic block." Undoubtedly a large number of reported installations of this character include the ordinary semaphore, operated by a telegraph operator, without any form of control, and since the estimated cost for future installations is based upon that reported for those already made it is believed that this figure is considerably less than the actual expense which would be involved.

No effort has been made to arrive at any figures for the installation of automatic stop devices, specified in H. R. 9330, in which the character of block is specified as one which will include automatic stoppage of trains in entering occupied blocks and automatic reduction of speed of trains entering side tracks.

The Block Signal and Train Control Board has not yet made a definite and positive recommendation for the use of an automatic stop. Since that board, which is empowered to investigate any satisfactory installation, has not been able to do so it is obvious that the device is still in the experimental state.

The prime essential of the automatic stop is its positive action under all conditions. Its use, therefore, for other than experimental purposes at the present time is manifestly an added element of danger.

TABLE 1.—EQUIPPED WITH BLOCK SIGNALS DECEMBER 31, 1910.

	Automatic. Miles of		Non-Automatic. Miles of	
	Road.	Track.	Road.	Track.
Total railways† .....	17,711	29,202	53,558	63,506
Railways reporting .....	15,470	24,867	39,668	47,084
Per cent. mileage reporting	87.3	85.2	74.0	74.2

†Reported by Block Signal and Train Control Board, 1911.

TABLE 2.—COST OF INSTALLATIONS PRIOR TO 1911.

	Automatic.	Non-Automatic.
Miles of track covered .....	24,867	41,505
Total cost .....	\$28,504,485	\$10,286,026
Cost per mile of track .....	\$1,146	\$248

TABLE 3.—INSTALLATIONS 1911.

	Automatic. Miles of		Non-Automatic. Miles of	
	Road.	Track.	Road.	Track.
Miles equipped .....	2,315	3,393	1,182	1,262
Estimated cost .....	\$4,180,568		\$441,700	
Cost per mile of track .....	\$1,232		\$350	

TABLE 4.—UNEQUIPPED MILEAGE.

	1st Track.	2nd Track.	3rd & 4th Track.
Total mileage in country† .....	239,991	23,452	.....
Already signalled, automatic‡ .....	20,026	10,874	1,695
Already signalled, non-automatic‡ .....	54,739	10,028	.....
To be signalled, automatic .....	219,965	12,578	.....
To be signalled, non-automatic .....	165,226	2,550	.....

†Poor's Manual, 1911.

‡Block Signal and Train Control Board's figures, plus 1911 installation.

TABLE 5.—COST OF EQUIPPING.

	Automatic.	Non-Automatic.
Total miles track unequipped .....	232,543	167,776
Estimated cost of installation, per mile .....	\$1,232	\$350
Total cost of installation .....	\$286,492,976	\$58,721,600

TABLE 6.—MAINTENANCE OF AUTOMATIC BLOCK SIGNALS.

Roads reporting .....	23
Number signal blades .....	23,254
Number miles track .....	9,474
Total cost of maintenance .....	\$1,605,087
Cost per signal blade per year .....	\$ 69.02
Cost per mile of track per year .....	\$169.31
Signal blades per mile of track .....	2.47

### ASSOCIATION OF RAILWAY ELECTRICAL ENGINEERS.

At the last session of the convention of the Association of Railway Electrical Engineers, the following officers were elected: President, F. R. Frost, electrical engineer, Atchison, Topeka & Santa Fe, Topeka, Kan.; first vice-president, D. J. Cartwright, electric engineer, Lehigh Valley, Phillipsburg, N. J.; second vice-president, C. R. Gilman, chief electrician, Chicago, Milwaukee & St. Paul, Milwaukee, Wis.; secretary, Joseph Andreucetti, assistant electrical engineer, Chicago & North Western. It was decided to hold the next annual convention at Chicago, and a semi-annual meeting will be held at Atlantic City on the day preceding the opening session of the Master Car Builders' convention. The following is an abstract of the report of the committee on train lighting.

#### ELECTRIC TRAIN LIGHTING.

*Head End Practice.*—The greatest extension in the use of the head end system, where special features have been involved, has been its introduction on the Baltimore & Ohio, where it has been installed on four through trains. Heavy grades restrict the operation of the turbines over several sections of the road, which, in connection with the varying make up of the trains during their runs, has necessitated large battery capacity per train and ability to charge the batteries at any time, regardless of the number of lamps burning. The standard 64-volt system is used with turbine equipments carried in the baggage cars and with five or six sets of 300 ampere hour batteries on a seven-car train. Each car, with the exception of the baggage and express cars, is equipped with a lamp voltage regulator. A standard make of regulator, as used in axle lighting, has been adopted. On baggage and express cars, on account of the few lamps installed not justifying the cost of a lamp regulator, a resistance is used which is cut in the lamp circuit while the batteries are being charged. A voltage of from 66 to 85 volts is maintained on the train line, depending on the amount of charging necessary. Tungsten lamps are used exclusively and an average life of 1,200 to 1,500 burning hours is being obtained, including breakage occurring in shipment, or installation. Special train electricians under the jurisdiction of a chief electrician are used to operate the equipments.

Further extension of the 60-volt system has been made on the

C. M. & St. P., though none of the other roads operating the 110-volt system have changed to the standard. Inasmuch as, in addition to the adoption of 60 volts as the standard voltage for the head end system by this association, this voltage has been recommended by the train lighting committee of the M. C. B. Association, and will undoubtedly be adopted this year by that association, it is hoped that the use of the 110-volt systems now in operation will soon be discontinued.

For through service the conditions favorable for the use of the head end system are large trains making long runs (at least ten hours) where the operating conditions and make up of the trains are such that the train, instead of the car, is the operating unit.

Turbine generator sets are recommended, and for through service should be located in the baggage car. The number of sets of batteries used depends on local conditions, but sufficient capacity should be provided to carry the lighting load until the nearest division point is reached, where repairs can be made, or the car may be replaced, in case of disablement of the generating equipment or the turbine car. The batteries should be so distributed that auxiliary light will not be needed while trains are being switched, or for cars dropped or picked up en route which are open to passengers while not connected to the train. The head end system of train lighting has been in use a sufficient length of time to demonstrate its reliability with proper equipment and methods of operation. The use of auxiliary lighting, other than electricity, is therefore not recommended, and only when the system is so operated that this can be done does the committee consider it on an equitable basis for fair comparison with the other systems of electric lighting.

Both rubber hose and metallic connections are used for the high pressure steam service between the locomotives and turbine cars. Data available is insufficient to determine definitely the relative reliability and cost of maintenance of the two kinds. Railways which have used both recommend the all-metallic connection as being more reliable and economical, though the results obtained with its use are not entirely satisfactory. The use of position locks on the couplers of the steam connections is recommended. There seems to be considerable room for development of an automatic coupler lock which will be simple and reliable.

The charging of batteries en route, as far as possible, is recommended. To insure batteries being kept in proper condition, gravity readings should be taken in connection with voltage readings at terminal stations and accurate records kept of their performance. With the head end system, especially where the charging of the batteries is dependent largely upon the judgment of the operators, the use of ampere hour meters, registering both charge and discharge, is strongly recommended. The ampere hour meter gives not only a ready indication of the condition of the battery, but provides accurate means for determining the amount of charge necessary.

Where tungsten lamps are used, and where it is necessary to do considerable charging of the batteries during the lighting hours, the use of lamp voltage regulators on each car is recommended. The regulators automatically maintain a constant lamp voltage, regardless of the train line or battery voltage, and at the same time do not require any changes in the connection of the standard three wire return loop train line, thus retaining the advantages of this system. The experience of a road which has used regulators in connection with its head end system for nearly a year and a half, has shown that the additional cost has been fully justified by the increase which was obtained in the lamp life.

The use of train electricians versus baggagemen to operate the lighting equipment is a question affected greatly by local conditions. Where a large number of batteries per train are required, or where the train make up of cars supplied with batteries varies considerably during the trip, requiring close attention to the operation of the equipment to keep the batteries

in proper shape, the use of train electricians is recommended as the best practice. Where baggagemen are used to operate the lighting equipment it is essential that they be trained to handle this class of work competently and that, as far as their work is concerned with the operation of the lighting equipment, they should come directly under the jurisdiction of the department responsible for the train lighting service.

**Axle Lighting.**—During the past year several chain drives have been in practical operation and the committee have been informed that the chain drive has proved itself worthy of consideration. The cost of application, including axle and generator sprockets, is about \$50 per car as compared with a cost of \$28 for pulleys and the best quality of belting. Where belts are used it is best to apply as long a belt as possible, thus permitting the ends to be trimmed from time to time, and affording a more secure fastening for the belt clamp where both ends meet. The proper belt tension has not been given due consideration by many; as a result the cost per car month is nearly three times as great on some roads as on others. The generator pulley should be as large in diameter as possible. A belt operating over a 12-in. pulley will give nearly 100 per cent. longer life than one operating over a pulley 8 in. in diameter.

Under normal conditions the cutting in speed should be 25 per cent. of the maximum train speed. No generators are built that can be properly regulated or controlled through a ratio greater than one to four. There are many advantages to be gained by operating the armatures at a minimum number of revolutions per minute. The belt speed is reduced, there is better commutation, less wear on brushes and bearings and there is less liability of hot boxes. During the past year the majority of the generators have been attached to the truck by the "four point" suspension, the design of which, however, can be improved to prevent the lateral movement of the generator and its support due to the movement of the truck in going over a curve or switch.

**Fuses.**—Engineers engaged in electric train lighting work, all report unsatisfactory service from the N. E. C. standard enclosed fuses, and with one exception do not favor its use. Troubles which have been experienced with this type of fuses are: Failure to indicate when blown; blowing at current values other than their normal ratings, both above and below; and open circuiting. Most of the engineers favor either the open link type of fuse or some special modification of that type. The committee recommends that the association through a proper committee, investigate this question during the coming year for the purpose of developing a suitable type of fuse which will meet the requirements of car lighting service. It is recommended that the fuse be of such design that it can be used in the same fuse holders as the N. E. C. standard enclosed cartridge fuses of the same capacities.

The committee was composed of A. McGary, chairman; W. C. Kershaw, E. A. Van Buskirk, L. S. Billew, D. J. Cartwright.

The Superior Committee on Railways at St. Petersburg, Russia, has expressed the desire that as the government cannot find the necessary funds to build the numerous desirable light railways for local development throughout the empire, private persons and local authorities should be invited to co-operate. Local authorities and others have been invited to suggest routes, and the response from the district of Karkhoff alone includes 67 more or less carefully considered projects, most of them without solid financial backing, but supported by bold traffic estimates. The committee has asked these promoters whether they are prepared to guarantee the traffic, and in case of deficit on traffic account, to pay the difference between their estimates and the amounts realized. A company is now being organized to build light railways and lease them out to local councils, etc. The promoters have in view particularly for the moment the following lines: Korotcha-Prokorovka, Novo-Siorgisk-Brailovska, and Starobielsk-Swatoff.



## THE LONG AND SHORT HAUL INJUNCTION.

*Atchison, Topeka & Santa Fe vs. U. S. of A. Opinion by Judge Mack:*

These cases involve the constitutionality and interpretation of section 4 of the act to regulate commerce of February 4, 1887, as amended June 18, 1910 (36 Stat., 539), and the powers of the Interstate Commerce Commission thereunder. . . .

At the time of the amendment a number of complaints of unreasonable and unjustly prejudicial rates filed by commercial bodies of the so-called intermountain cities, such as Spokane, Washington; Reno, Nevada; and Phoenix, Arizona, were pending before the commission. Similar complaints had been filed and partial adjustments thereof made at various times, beginning with the year 1892. Because of the amendment, the commission refrained from finally determining the commodity rates to which these cities were entitled on west-bound traffic, believing that orders made under applications for relief, as provided in section 4, would obviate the necessity therefor.

Applications were duly filed in a form prescribed by the commission, which required carriers to state that the rate to the intermediate points should not be more than a certain number of cents per 100 lbs. per ton, per car, or per package, in excess of the rates to the farther point, in and by which applications the carriers asked to be allowed to maintain the Pacific coast terminal rates then in force, lower than the rates to intermediate points fixed by specified tariffs on file with the commission. After a full hearing and investigation two reports and orders were made. . . .

The first order provided that for the purposes of the disposition of the applications the United States should be divided into five zones (being the same as those specified in a Transcontinental Tariff on file). . . .

The order then proceeded . . . [to deny authority to maintain higher commodity rates from points in Zone No. 1 to intermediate points than to Pacific coast terminals, and to allow commodity rates from all points in zones numbered 2, 3, and 4, to points intermediate to Pacific coast terminals that are higher to intermediate points than to Pacific coast terminals, and to fix the relation of these rates.]

The second order is similar in all respects except that it refers only to Spokane and certain other intermountain cities, and expressly provides that the carriers shall comply therewith for a period of not less than two years.

The two suits brought in this court to enjoin the enforcement of these orders, respectively, were heard together. The same questions are presented in each of them.

First: We agree with the commission that section 4 of the act to regulate commerce as amended June 18, 1910, is constitutional. The commission concedes, and we concur therein, that if the first proviso in this section is to be literally construed and if, under such construction, no limit has been imposed upon and no standard given to guide the exercise of the commission's discretion in granting authority to depart from the rule forbidding a lesser rate for the long than for the short haul in the same direction and over the same line or route, the proviso would be unconstitutional as an unlawful delegation of legislative power. We concur, too, in the commission's view that if the proviso were for this reason illegal the entire section would thereby be nullified, inasmuch as both the context and the history of the act demonstrate that the proviso is an integral part of the section, and that a hard and fast rule absolutely prohibiting such a lesser rate would not have been enacted.

To determine, however, the true meaning of the proviso, the entire act must be examined. In the light of the other sections, and of the legislative and judicial history of the long and short haul clause, we are of the opinion that the guide to the exercise of the commission's discretion is to be found in the other sections of the act, thereby making the discretion to exempt carriers from the prohibition in fact not unlimited, and imposing upon the commission not merely the right but also the duty to grant such

exemption whenever, on investigation, it shall find that no violation of any section of the act would thereby be involved.

If, therefore, the proposed rate, lower for the long than for the short haul, violates no provision of the fact, and if, in particular, it neither tends to produce an unreasonable rate for the short haul nor operates unduly to prejudice the short-haul point and unduly to prefer the long-haul point, it is the duty of the commission to grant exemption from the hard and fast rule laid down in the first clause of section 4.

Second. The orders sought to be enjoined do not establish absolute rates for either the long or short haul or prescribe the extent, in dollars and cents, that the short-haul rate may exceed the present or some definitely fixed long-haul rate, but they do establish a relation between any long-haul rate that the carrier may put into effect and the short-haul rate, determining that from zone one the western short-haul rate shall not exceed the long-haul rate, and that from zones two, three, and four, the short-haul shall not exceed the long-haul rate by more than 7 per cent., 15 per cent., and 25 per cent. respectively.

The commission found specifically that the Pacific coast rates from part of this eastern territory were forced by water competition, and that the rates from other parts were forced by market competition; for example, that the railroads based the New York-Seattle rate on the ocean competition and that they granted the same rate from St. Paul to Seattle in order to enable St. Paul to compete with New York in the Seattle market.

Under the fourth section as originally framed, it was decided (*E. T., etc., Ry. Co. v. I. C. C.*, 181 U. S., 1, and cases cited therein) that carriers might, in the first instance and without application to the commission, make the rate less for the long than for the short haul, if, in fact, the circumstances and conditions were not substantially similar, taking their chances on a subsequent determination by a court that they had erred in so doing and had thereby violated the law. They could, however, and in many instances did, apply to the commission for the authority. After the section was construed as not requiring such an application in the first instance, the carriers, it was often charged, abused their privilege by making the rate for the long haul less than for the short haul, although the circumstances and conditions were substantially similar; this charge was, in any event, one of the causes that led to the amendment of the section whereby the clause "under substantially similar circumstances and conditions" was eliminated therefrom. The practical change thereby produced in section 4 was to compel the carriers to make application to the commission if they desired to continue this practice.

The violation of the long and short haul rule is, however, only one instance—a most striking and irritating one, it is true—of the preference and prejudice which, when undue, is prohibited by section 3. Any violation of the original fourth section would necessarily involve a violation of the third section and, *e converso*, if the lesser rate for the long haul than for the short were not in violation of the third section it could not be in violation of the original fourth section. In *E. T., etc., Ry. Co. v. I. C. C.*, *supra*, the court held that when it is established that the rates charged to the shorter distance point are just and reasonable in and of themselves, and that the lesser rate for the longer haul is not wholly unremunerative and has been forced upon the carriers by competition at the longer distance point, it must result that a discrimination springing alone from a disparity in rates can not be held to be, in legal effect, the voluntary act of the carriers, and that therefore the provisions of the third section will not apply. The prohibition of the third section, it was said, is directed against undue preference arising from the voluntary and wrongful act of the carriers, and does not relate to acts the result of conditions wholly beyond the control of such carriers; the lesser rate for the long haul could not produce an unjust preference under the third section when the competitive conditions at

the longer distance point which had caused the lesser rate would produce the same preference, even though the carrier were forbidden to meet the competition. For example, as Seattle can get its supplies from New York by water, and Spokane, because of its location, can not do so, Seattle can not be said to be unduly favored merely because the rail carrier, in order to meet the water competition, charges a lesser rate from New York to Seattle through Spokane than from New York to Spokane, provided the Spokane rate is reasonable *per se* and the Seattle rate not unremunerative. And so, too, if the St. Paul-Seattle rate is reduced to a point less than reasonable *per se* although not unremunerative, to meet the New York-Seattle rate in order to enable the St. Paul merchants to compete with New York merchants at Seattle, Spokane could not complain merely because this rate is made less than the St. Paul-Spokane rate. In each of these cases Spokane is not unduly prejudiced, because if the lower rail rate to Seattle were forbidden Seattle would nevertheless, by reason of its location, be able to secure its supplies by water, and would therefore in the nature of things have the advantage over Spokane.

While the primary question in the *E. T., etc., Ry. Co.* case, *supra*, was as to the right of the carriers, in the first instance and without application to the commission, to make lesser rates for the long than for the short haul, inasmuch as the original complaint charged a violation of both the third and the fourth sections, the court necessarily considered section 3, and held that it could not be violated by making a lesser charge for the long than for the short haul, if the long-haul rate was forced by competition and was not unremunerative.

This construction of section 3 was not dependent upon the clause in section 4 which, by the amendment of 1910, has been stricken out. It was based upon the language of section 3 itself, which forbade not any preference but only an undue preference, and upon the determination that, in the nature of things, there could be nothing undue in a preference which was caused by the natural geographical situation, and which would continue even if there were no railway carriage. The amendment to section 4, therefore, has not changed the construction of section 3, and it follows that no unjust prejudice to Spokane and other interior points can now be predicted merely on the fact that the rate from any of the eastern territory is less to the Pacific coast terminals than to the intermediate points.

The commission also found, however, that the present Pacific coast rates from zone one had not been proven by the carriers, upon whom the burden was laid, to be less than reasonable *per se*. Assuming that they were fully reasonable *per se*, the commission would have the power to refuse exemption from the long and short haul requirement, for under these circumstances any higher rates to intermediate points could be condemned as unreasonable and thus in violation of section 1 of the act.

But the order of the commission as to this territory is not limited to a denial of the applications in the form in which they were presented, that is, to a denial of the maintenance of the then prevailing rates to the coast concurrently with higher rates to the interior points. It forbids the carrier to maintain *any* coast rate lower than the contemporaneous intermediate rate from these points. In other words, if the carrier from St. Paul in order to meet new water competition from New York should reduce the St. Paul-Seattle rate to a point less than at present and less than a rate reasonable *per se*, but nevertheless somewhat remunerative, it would be compelled, under this order, to grant the same rate to the interior point, even though, under these circumstances, a reasonable rate to the interior point higher than the unreasonably low rate to the coast point forced upon the carrier by such market competition under penalty of losing the business would not be in violation of section 1 or of any other provision of the act.

This is likewise true of the order as to rates from the other zones. It is not based upon the current coast rates. It deter-

mines the relation of the short-haul rates to *any* coast rates that might be established by the carriers. It makes illegal a rate from Chicago to Spokane more than 7 per cent. higher than an unreasonably low but remunerative Chicago-Seattle rate forced by competition, even though the Chicago-Spokane rate be reasonable *per se* and not in violation of any provision of the act.

Is the commission empowered to make such an order? It is urged that even if it must grant an application for relief, when the lower long-haul rate involves no violation of the act, nevertheless it may determine the extent of the exemption and therefore it may fix the relation of rates.

But to sustain the constitutionality of the proviso in section 4 it must be read as imposing the duty on the commission not only to grant exemption from the hard and fast rule when thereby no section of the act is violated, but also to grant such exemption to the extent that no section of the act is thereby violated; that is, the carrier is entitled under the act to be granted authority to charge as much less as it please for the long haul than for the short haul, provided the commission shall first determine that it does not thereby violate any other provision of the law. In granting authority to make an absolute long-haul rate lower than some short-haul rate, the commission would have the power and the duty to prevent a violation of section 1 and, by virtue of its authority to determine reasonable rates, to fix the short-haul rate.

Doubtless the commission could, moreover, in order to prevent a violation of section 3, make relative rates in so far as this might be necessary to prevent an undue preference. For while, under the decision in *E. T., etc., Ry. Co. v. I. C. C.*, *supra*, undue preference could not be predicated merely on the fact that the rate was less for the long than for the short haul, when the former was forced by water, market, or any kind of competition, it might be predicated thereon if the short-haul rate were not likewise based upon the same competition in so far as and to the extent that it ought fairly to be influenced thereby.

But neither the equality of rates on shipments from zone 1 nor the relation between the rates on shipments from the other zones, as fixed in the order of the commission, can be sustained upon any such considerations. In so far as the commission attempts thus to determine the relation of the long and short haul rates, irrespective of absolute rates, it goes beyond any authority that has been vested in it, for it is not in the power of the commission to say that 100 per cent., 107 per cent., or any given percentage of an unknown less than reasonable rate to the coast is necessarily a maximum reasonable and non-discriminatory rate from the same point of origin to an interior point.

The practical effect of the commission's order is either to compel a blanket rate from the entire east to the entire west, or to prevent the carriers from getting all the business which they now secure without loss by making rates which enable merchants to meet market competition. For example, if the forced New York-Seattle rate is \$1, the St. Paul-Seattle rate can not be made higher by the St. Paul carrier, unless it gives up the benefit of business which market competition at Seattle might bring to it. As long as it charges no one else an unreasonable rate, and as long as it does not carry under cost, it is entitled to grant St. Paul the market competitive rate of \$1. Under the order, its rate to Spokane in that event could not exceed \$1, while the New York carrier could charge \$1.25. The latter, however, would also have the right to enable New York to meet St. Paul competition in Spokane. To do this it would have to reduce the New York-Spokane rate to \$1. The result would be either to compel a blanket rate from all points east of St. Paul to all competitive points west of St. Paul or to force the carriers to give up some business which could be carried without loss to themselves or damage to anyone else. The commission's order, moreover, does not even secure to Spokane the market competition of St. Paul and New York, since it empowers the railways to charge a higher rate from New York, which might exclude New York from the Spokane market.

In a word, unless some through business is given up, the ef-



fect of the orders would be to put Spokane and other interior points on an equality with Seattle and other Pacific coast points, at least from zone one,—a position to which they would not be entitled under all circumstances in view of their relative locations, the former four hundred miles more or less in the interior, the latter on the coast.

It follows that the motions to dismiss the petitions must be denied and that writs to enjoin the enforcement of the orders, pending the final determination of the cases, must be issued. And it is so ordered.

*Judge Archibald, concurring:*

It is conceded that if the right to approve or disapprove of an application by a carrier to charge more for a shorter than for a longer haul is left by the fourth section of the interstate commerce act, as it is at present amended, to the uncontrolled discretion of the commission, the section is invalid; also, that the proviso taken as it reads in terms confers such unlimited discretion; and that the section is only therefore to be saved in case a guide is found in other provisions of the statute.

Undoubtedly the statute is to be taken as a whole and the different sections read together, but I fail to see how this helps out the matter. By the first section it is prescribed that all charges for any service rendered or to be rendered by carriers subject to the act in the transportation of passengers or property shall be just and reasonable, and every unjust and unreasonable charge is prohibited and declared unlawful. This does no more than enact the common into the federal law, and neither adds to nor detracts from the rights of such carriers, except as it inferentially recognizes their right to a just and properly remunerative rate, in prohibiting an unjust and unreasonable one. But how does this assist the commission in any given case whether to enforce or relieve the carrier from the greater short than long haul charge prohibited by the first part of the section in question, or what direction or guide to that end does it afford? No doubt it insures to the carrier that the short-haul charge shall be reasonably remunerative where it has not been voluntarily abandoned, although the commission in the order made has entirely disregarded this. But that is only half of the problem to be solved, if, indeed, it is that much. The point is that it affords no guide in determining when a disparity between the short and the long haul shall be permissible, which is the question which in each case is to be decided by the commission. But it is further said that at this juncture the third section comes in, and authorizes a less charge for a long than for a short haul, provided an undue or unreasonable preference or advantage does not result to any person or locality over any other. But this provision of the statute is not permissive, but prohibitive. It forbids in brief any undue discrimination, as the first forbids unjust or unreasonable rates, or the fourth the particular kind of discrimination against which it is leveled. It may be, correlatively or by inference, that a right to discriminate is recognized when it can be done without injustice or prejudice. But how again does this afford a guide to the commission in determining when a greater short than long haul charge shall be sanctioned? The fourth section in express terms declares that except as extenuated by the action of the commission a greater short than long haul charge is per se a discrimination and advantage which is unjust and undue, and not to be tolerated. And how is it possible, then, to say that a prohibition against what is undue furnishes a guide or rule in determining when it shall result that, that which so on its face is to be regarded as undue shall no longer be so? There shall be no undue discrimination, says the third section. A greater short than long haul charge is an undue discrimination, says the fourth. At what, then, do you arrive by combining the one with the other? Or where is here to be found the criterion or standard, which is to enable the commission to say when and under what circumstances that which it is bound otherwise to say is an unjust and undue preference or advantage of one locality over another is not so? All the guide there is, is its say-so. But if

it rests merely on that the enactment is confessedly void, and the action of the commission has nothing to sustain it. And that is the only conclusion which I can reach with regard to it. It is held good by the court for the reasons given by the commission, but to this I can not agree, and feel compelled in consequence to give expression to the views which I entertain to the contrary. There are at least such grave doubts with regard to the validity of the section that the question might well be passed by at this time, there being other grounds upon which the invalidity of the action of the commission may be rested.

For there can be no reasonable doubt that, assuming that the fourth section is valid, the orders of the commission go far beyond the power conferred by it. The authority given by the proviso is upon application of the carrier in *special cases* after investigation to permit the charging of less for longer than for shorter distances, the commission having the right from time to time to prescribe the extent to which the carrier may be relieved from the absolute prohibition against this, which is otherwise imposed upon it. There must thus in each instance be an application by a carrier, and a special case which entitles the carrier to relief—whatever that may mean—must be set up and made out. And this fixes the limits of the commission's authority. Its duty is to investigate what is so brought before it, and, if a case warranting it appears, to approve the application; or if not, to refuse it. The commission can not go on if it does not approve and make rates, or lay down rules by which they shall be made, upon its own initiative. The carrier in making application for approval does not submit or subject itself to any such exaction. The right to inaugurate to this extent still remains with the carrier the same as before the amendment. The authority assumed by the commission here is not to be implied from the right to prescribe the extent to which from time to time the carrier may be relieved, in the words of the statute. This refers to the special case in each instance which the carrier is required to make out in order to get the approval of the commission, and is necessarily confined to it. In this respect the phraseology of the section is not changed, and it never by any previous construction was carried outside of this, nor is there anything now which requires it. It may be that the applications made by the carriers here for the approval of existing long and short haul tariffs, blanketing the country, went beyond the statute. But if that was the case, the proper course to pursue was to throw them out upon that ground. The mere fact that they were in this form gave the commission no authority to go on and prescribe rates by the wholesale. The orders in controversy extend to the entire continent from east to west, saving only a comparatively small section in the southeast, which is reserved for subsequent consideration. This can not by the broadest construction of the law be brought within it. By no device can the whole United States be made a "special case" nor can the commission upon any just conception of its powers, lay down a hard and fast rule which shall apply to every long and short haul case wherever originating or whatever its destination from east to west across the country. Nor is this saved by the establishment of zones with varying percentages. As pointed out in the opinion of the court, this entirely disregards the right of the carriers to have considered what in each instance is a reasonable rate between points involved. It also overrides the established right of the carriers to make a less than reasonable rate to and from competitive points from whatever cause that competition arises. And it is an attempt to overcome the advantages possessed by coast over inland cities in the face of what nature has provided. All this is fully discussed in the opinion of the court, in which I fully concur, and to which I can add nothing of consequence. For these reasons, without regard to any others, the orders of the commission were clearly invalid, and an injunction against them is properly to be granted, the motion to dismiss being necessarily overruled as the consequence. But I can not see my way to go beyond this and declare the fourth section valid, on which, if anything is to be said, my opinion is to the contrary.

## AMERICAN RAILWAY ASSOCIATION.

The fall session of the American Railway Association was held at the Blackstone Hotel, Chicago, Wednesday, November 15. There were present 175 members, represented by 182 delegates. The executive committee reported that the membership now comprises 348 members, operating 256,676 miles, an increase of 303 miles. The associate membership now comprises 99 members, operating 5,084 miles; increases of 15 members and 523 miles.

The executive committee has appointed a standing auditing committee for the ensuing two years, or until its members' successors are elected, consisting of the following: J. A. Taylor, controller, Central of New Jersey; C. P. Crawford, controller, Erie, and J. W. Orr, assistant to controller, Pennsylvania Lines West. B. F. Bush, president of the Missouri Pacific, has been elected a member of the executive committee to fill a vacancy.

The committee on transportation submitted several questions and answers concerning practice under the standard form of detour agreement, which were duly approved by the association. The committee said that it has under consideration a general revision of the Standard Code of Train Rules, and in that connection said that it desires the views and criticisms of the members of the association respecting the present code. It also reported that under date of July 28, 1911, a circular letter was issued to the members of the association, requesting three copies of the train rules on their respective roads. Replies thereto have been received from 329 memberships and 67 associate members. Arrangements have been made by the committee to obtain a complete compilation of this information, showing the railways which have adopted the Standard Code and any and all modifications thereto now in effect on the various roads members of the association.

A progress report was presented by the committee on Maintenance. It is said that, as mentioned in its report of April 18, 1911, the sub-committee on Standard Dimensions of Box Cars and Standard Clearances issued a circular, No. 1022, dated June 14, 1910, asking for information necessary to be obtained in dealing with right-of-way clearances. It also issued a second circular, No. 1118, asking for information as to the maximum dimensions of box cars. The two circulars were addressed to 344 members and 84 associate members. Replies to Circular No. 1022 have so far been received from 269 members and 33 associate members, and to Circular No. 1118, from 240 members and 16 associate members. The number of roads from which replies have not been received are of sufficient mileage and equipment to warrant the committee delaying the ultimate report, as additional replies are being received from time to time. It also reported that E. C. Carter, chief engineer, Chicago & North Western, has been elected chairman of the committee. The committee included in its report a summary of replies received to Circular No. 1120, showing the number of freight cars fitted with air brakes and engines equipped with power brakes in use as of July 1, 1911, as follows:

Number of members reporting.....	353
Freight cars in service.....	2,341,008
Fitted with air brakes.....	2,325,749
Not so fitted.....	15,259
Engines in service.....	63,705
Equipped with power brakes.....	63,659
Not so fitted.....	10
New equipment other than passenger under contract or construction—	
Freight cars to be fitted with air brakes.....	26,788
Freight cars not to be fitted with air brakes.....	0
Engines to be equipped with power brakes.....	1,037
Engines not to be equipped with power brakes....	0

The committee on Relations between Railroads presented several amendments to the car service rules, which were approved by the association. On its recommendation, the association adopted the following resolution: "Resolved, That the railway companies be requested to designate to the *Official Railway Equipment Register* the names of the proper officers to whom reports should be addressed containing information relating to the old and new weights of cars re-stenciled on foreign lines

under the provisions of car service rule 11, in order that this information may be published therein." The committee included in its report interesting statistics representing freight car performance and car surpluses and shortages. The committee also submitted a compilation which was made under its direction respecting freight cars owned, cost and maintenance for the year ending December 31, 1910.

The committee on Safe Transportation of Explosives and Other Dangerous Articles reported the Interstate Commerce Commission's regulations for the transportation of dangerous articles other than explosives, effective October 1, 1911. It also submitted the proposed amendment to the Interstate Commerce Commission's regulations for the transportation of explosives, which are to be promulgated by the commission at a later date.

The committee on Electrical Working reported that the committee's work has been in endeavoring to establish a standard location for the electrical connections between electrically operated cars and standards for overhead crossings of electrical light and power lines. The various sub-committees considering these subjects have done considerable work, but were not able to present final reports. The committee therefore reported progress on the work which it has in hand.

The Grand Trunk, the New York, New Haven & Hartford and the St. Louis & San Francisco were elected members of the committee on the Safe Transportation of Explosives and Other Dangerous Articles. The Illinois Central and the Long Island were elected members of the committee on Electrical Working. J. M. Gruber, general manager, Great Northern, and C. W. Kouns, general manager, Atchison, Topeka & Santa Fe, were elected members of the committee on Nominations. The association decided to hold its next meeting in New York City on May 15, 1912.

The railways supporting the Special Committee on Relations of Railway Operation to Legislation met just before the American Railway Association and confirmed the nomination of the following members of the committee for the ensuing year: W. J. Jackson, vice-president and general manager, C. & E. I., chairman; F. O. Melcher, vice-president, Rock Island Lines; J. C. Stuart, vice-president, Erie; C. A. Wichersham, president and general manager, Atlanta & West Point.

## FOREIGN RAILWAY NOTES.

The legislature of the state of Sao Paulo, Brazil, has authorized the construction of a line between Itiacy and Campinas. This line will connect all the lines of 3 ft. gage of the states of Minas Geraes, Sao Paulo, Goyaz, Matto, Grosso, Parana, Rio de Janeiro and Espirito Santo with Rio Grande do Sul and the republics of the River Plata and Paraguay on the southern frontier.

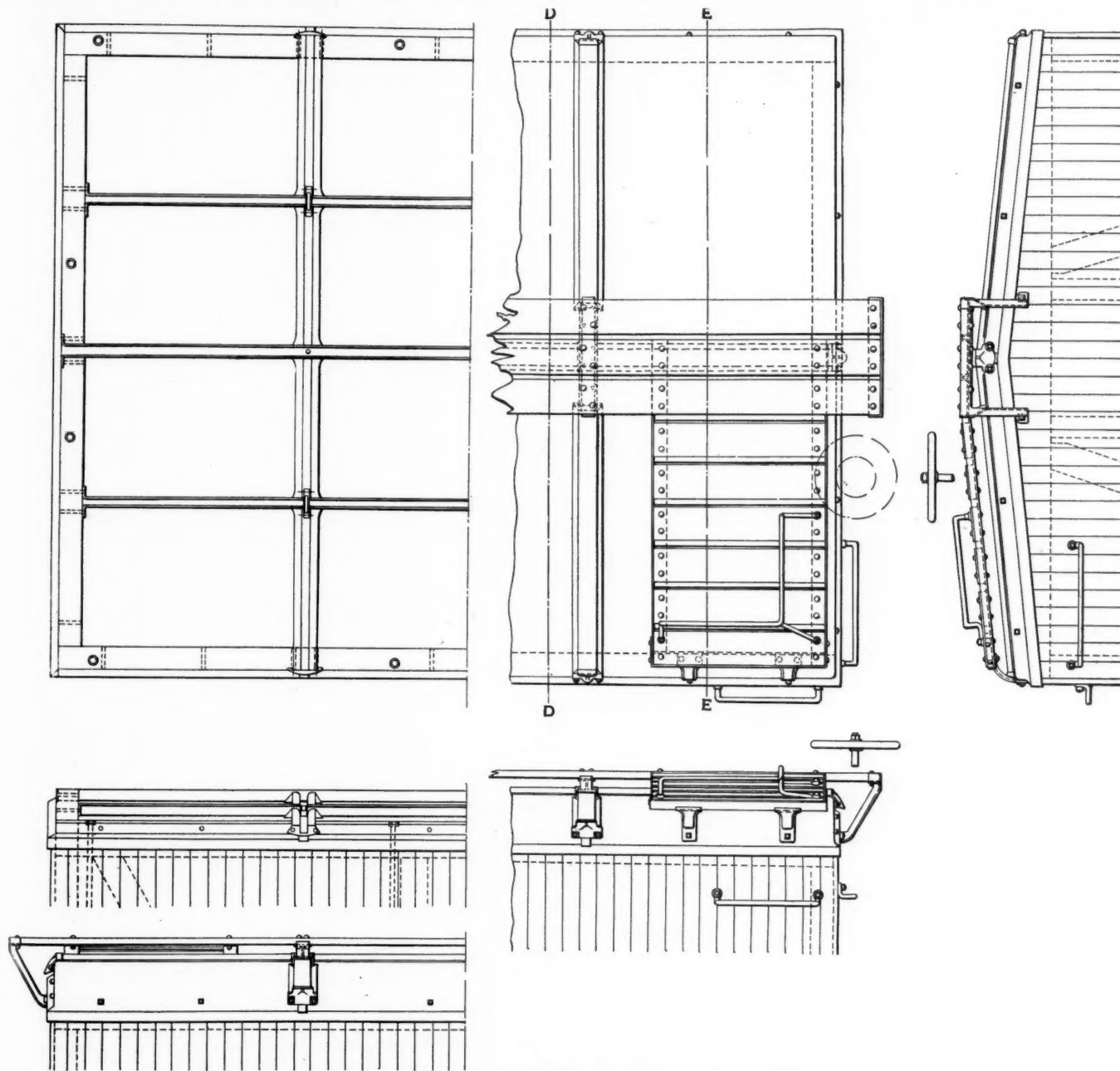
The Peruvian Corporation, which controls about 65 per cent. of the Peruvian railways, acquired in July, 1910, the exceedingly important Guaqui La Paz Railway, running from the southern extremity of Lake Titicaca to La Paz, Bolivia, and forming a connection with the Southern Railway of Peru by lake steamers. The corporation previously operated this road under lease, and the ownership now greatly strengthens its hold upon the Bolivian trade in competition with Chilean railways from Arica and Antofagasta, Chile, to La Paz. This corporation has been granted the right to make studies of the Bay of Matarani in southern Peru, with a view to submitting plans for the construction of a harbor, port and railway as a water terminal of the Southern Railway to Arequipa and La Paz. The Peruvian Corporation has also undertaken to carry out for the government's account a survey from the Cuzco extension of the Southern Railway to the navigable waters of the Madre de Dios river. Under the contract the corporation has for three years after the completion of the survey the preferential right to construct a railway with a federal guaranty of interest on the capital employed and a grant of about 7,910 acres per mile of line constructed.



**FLEXIBLE METALLIC ROOF FOR BOX CARS.**

A flexible metallic roof has been designed for use on either wooden or steel box cars by the Franklin Railway Supply Company, New York, the idea being to provide a roof more flexible than wood, and one that will have a longer life. It is constructed of metal throughout, and the various members of the roof and frame interlock in such a manner as to prevent them from shifting. The supporting frame is not only of sufficient strength to carry the roof, but also to tie the sides and ends of the car

galvanized, and since the air can freely circulate through the ridge pole and carlines, excessive corrosion is not liable to take place. Furthermore, any foul or moisture laden air which may accumulate in the car may escape to the outside atmosphere through the openings at the sides of the ridge pole and purlins where they enter the carlines. The roof may be applied by the usual laborers generally employed on this class of work. If the ridge pole, purlins or carlines become distorted through wreck or fire, they can usually be straightened and used again, and if they should be distorted beyond reclaiming, the salvage will



**General Arrangement of Flexible Metallic Roof for Box Cars.**

together. The use of steel throughout reduces the fire hazard and provides a more substantial and permanent construction.

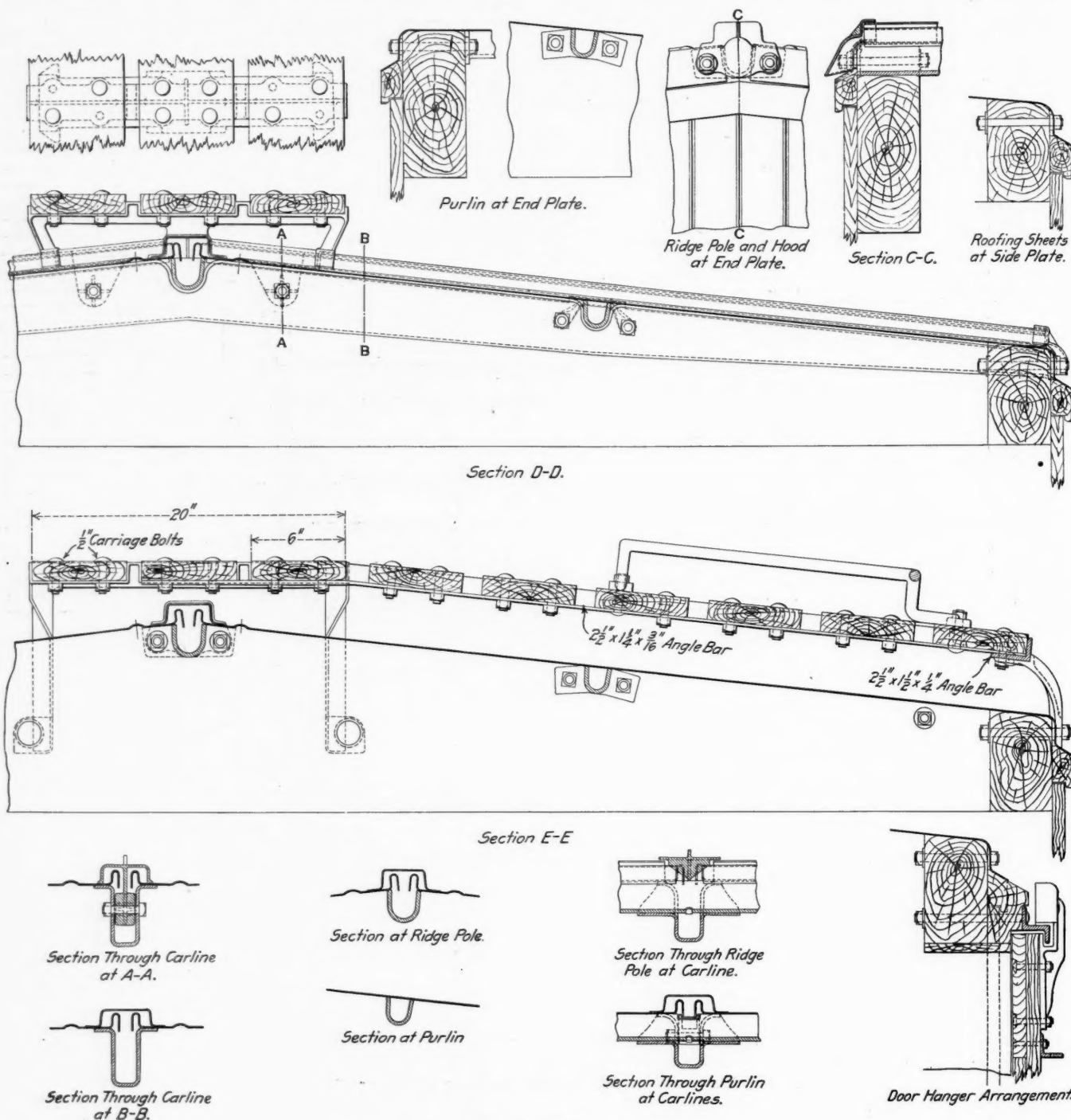
The roof sheets are given ample flexibility independent of the joint, and are surrounded by troughs or gutters formed by the U section ridge pole and carlines. Caps cover the gaps between the sheets, and any water which may enter under the caps and work its way up and over the turned-up edges of the roofing sheets falls into the troughs and is carried to the sides or the ends of the car by gravity. For this purpose the carlines extend through the side plates and the ridge pole through the end plates. As all of the parts which are exposed to the atmosphere are

amount to something, whereas if they were of wood they would either be shattered or burned. The total weight of the roof is approximately 2,500 lbs.

The roofing sheets rest directly on the side and end plates, the steel carlines, the steel purlins and the steel ridge pole. They are made from 1-16 in. galvanized steel plates. The edges of the sheet, which are adjacent to the carlines and ridge pole, have upturned and then downturned edges extending slightly below the top face of the carlines and ridge pole. The edges of the sheets at the sides and the ends of the car are turned down over the side and end plates. They have large radii at the bends, and

the lower ends of the sheets are flared out to lap over the top edges of the fascia boards. The sheets are secured at the eaves and the ends of the car by square-necked collar bolts which pass through the downturned flanges and the sides and end plates of the car. These bolts are provided with collars to prevent any water following the bolts through the side plates and into the car. The roofing sheets are held down at the carlines and ridge pole, but are not rigidly secured. The running board saddles are

carlines; thus the entire weight of the saddles, running boards and any weight passing over them is taken directly by the carlines, and as the saddles are placed at a fixed distance above the carlines, the roofing sheets cannot become bound or pinched. The saddles are provided with pockets for receiving the ends of the carline and the ridge caps. A web extending down from the underside of the saddles at the center engages with the top edges of the ridge pole, thereby holding the pole in place in the



Details of Flexible Metallic Roof for Box Cars.

made of malleable iron and are arranged for three 6-in. boards, which are fastened to the saddle by carriage bolts. To keep the boards in line the top horizontal member is provided with projecting lugs at the ends and between the boards. Small corner projections are also used which enter the boards at their edges, thus preventing them from shifting endwise. Two lugs provided with holes near their ends extend from the under side of the saddles. Horizontal bolts pass through these holes and the walls of the

carlines. If desired, running board saddles can be provided with wooden blocks so that the boards may be attached by wood screws.

Malleable iron hoods are placed at the ends of the carlines and prevent the entrance of dirt and cinders; but they are also arranged to allow the water to flow from the trough of the carlines. The carline hoods are also arranged so as to hold the carline caps in place at the eaves of the car. The hoods are at-



tached by the same two horizontal bolts which are used for fastening the carlines, thereby making a metal to metal connection. There are malleable iron hoods at the ends of the ridge pole to prevent the entrance of cinders or other foreign matter, but they are designed so as to permit the flow of water from the trough of the ridge pole. The ridge pole hoods are arranged to hold the ridge caps in place at the ends of the car. The hoods are attached by the same two horizontal bolts which are used for fastening the ridge pole. The carline and ridge caps are made from 1-16 in. galvanized steel plates pressed to the required shape. They are fastened by their outer ends being fitted into pockets in the carline hoods, and their inside ends into pockets in the running board saddles. Ample clearance is provided between the caps and the upturned edges of the roofing sheets in order to take care of the movement of the sheets. The intermediate ridge caps are secured by their ends fitting into pockets in the running board saddles. The end caps are fastened by their outer ends fitting into pockets in the malleable iron ridge pole hoods, and their inside ends into pockets in the running board saddles. Sufficient space is allowed between the caps and the turned-up edges of the roofing sheets to provide for the necessary movement of the roofing sheets.

The carlines are of pressed steel and have a U-shape section. They extend through the side plates, the plates being gained to receive them, which places the top edges of the carlines on the same plane as the side plates. The ends of the carlines are turned down, and the carlines are fastened by two horizontal square-necked collar bolts passing through this turned-down portion and the side plates of the car. The same bolts which are used for attaching the carlines are also used for securing the roofing sheets and the carline hoods at these points. The carlines taper from the ridge pole to the side plates, and the top edges are depressed to receive the ridge pole and the purlins. They are attached to the side plates so as to give the minimum fascia width, thus providing the maximum car clearance at the eaves. The fascia boards project beyond the ends of the carlines and the carline hoods, thereby protecting them from being raked by projecting obstacles. The ridge pole and the purlins are rolled steel bars and are also U-shaped in section. They pass over the carlines at the depressed sections, thus placing their upper edges on the same plane as the top edges of the carlines. The sides of the purlins are cut out where they pass through the carlines to receive the purlin-carline keys. A hole is placed at the bottom of the ridge pole and purlins, where they intersect the carlines, which forms a drain from these members to the carlines. The top edges of the ridge pole and the purlins are flush with the top of the end plates. The ridge pole extends through the end plates, which are gained to receive it, but the purlins only extend to the inside face of the plates. Both the ridge pole and the purlins are flanged out at their ends and are fastened by two horizontal bolts which pass through these flanged-out portions and the end plates. It will be seen that the end plates are placed between the flared-out ends of the ridge pole and the purlins, thus providing a strong end-plate attachment. The purlin-carline keys are made of drop-forged steel. They pass over the top edges of the purlins at the carlines, the purlins being cut out to receive them; the keys are attached to the carlines by two horizontal bolts which pass through the walls of the carlines. This arrangement anchors the purlins to the carlines.

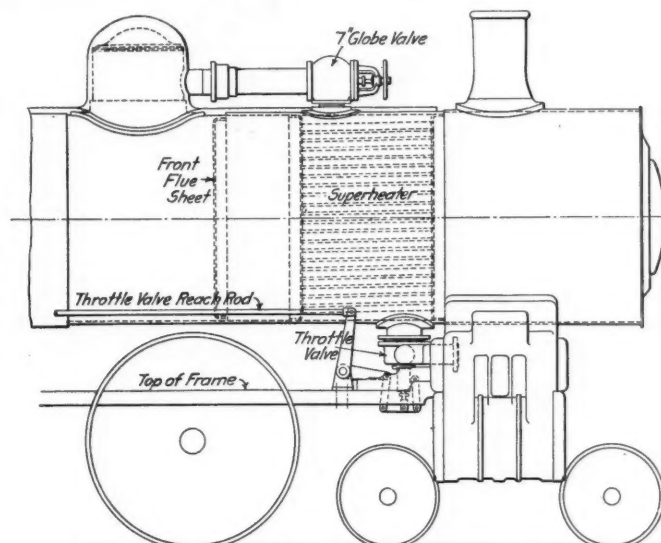
The running board side and end extension supports are also made of rolled steel angle bars. It will be noted that the weight of the running board extensions and any one passing over them is not placed upon the roofing sheets. The fascia boards extend beyond the brackets, which protects them from being raked off.

The minister of industries and public works of Chile has approved the final plans for the construction of a railway from Cajon to Llama. The distance to be covered by this line will be 28 miles.

#### EXTERNAL LOCOMOTIVE THROTTLE.

An external throttle valve has been designed and patented by W. F. Buck, superintendent motive power of the Atchison, Topeka & Santa Fe, to overcome the disadvantages of the common inside valve. It was designed primarily for use on locomotives equipped with superheaters, but is equally applicable to locomotives using saturated steam. Views of the throttle and its connections as applied to a locomotive equipped with the Buck-Jacobs superheater are shown in the accompanying illustrations. The throttle is secured beneath the superheater on the outside of the boiler shell. Above the superheater outside the shell is a large globe valve, which is connected to the dome by a pipe. Short steam pipes lead from the throttle to the cylinder saddle casting. The throttle is operated by a bell crank connected to a reach rod leading to the cab. A Pacific type locomotive equipped with this throttle has given excellent results in both freight and passenger service. The locomotive starts more easily and the response to the movement of the throttle valve is more sensitive than with the ordinary type of throttle. No difficulty has been encountered from accumulations of water of condensation.

The throttle is supported by a cast steel saddle which is riveted through its upper flange to the boiler shell; the throttle box is bolted to the lower flange of the saddle, and a steam tight



External Throttle Applied to Buck-Jacobs Superheater.

joint is made between the box and saddle by the usual form of ball joint ring. The throttle is controlled by a stem passing through a packing gland beneath the throttle box. The steam enters the throttle through the saddle and passes to the channels in the cylinder saddle casting through two steam pipes cast in one piece with the throttle box. In the case of a smoke-tube superheater the saturated steam may be led to the superheater header, either by an external pipe from the dome, or by the usual inside dry pipe. Superheated steam may be led from the header to the throttle by two steam pipes, similar to the common form of smoke box steam pipe.

The external throttle is readily accessible for inspection and repairs at all times. The joints are outside of the boiler shell where steam leaks may be quickly detected and where repairs may be made conveniently. They are removed from the intense heat of the smokebox, and in the event of a leak the steaming qualities of the locomotive are not affected. The accessibility of the throttle has many advantages. Repairs can be made to the throttle while the boiler is under steam pressure, as the globe valve near the dome may be closed, thus shutting off steam from both the throttle and the superheater.

When an inspection is to be made of a boiler equipped with the common arrangement of throttle, it is necessary for the

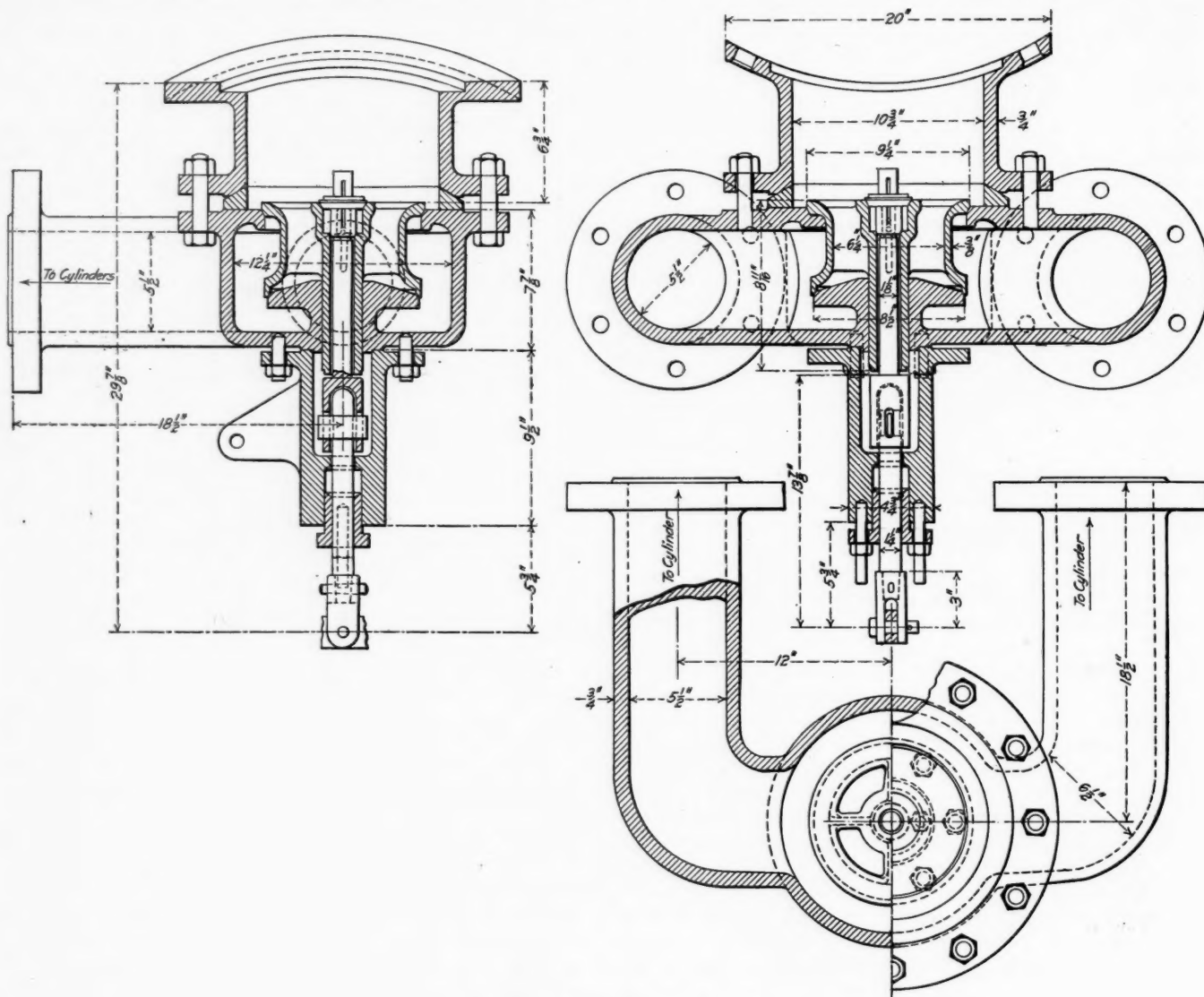
engine house foreman to send a machinist to remove the dome cap and take out the throttle valve, standpipe, etc., so that a boilermaker can get into the boiler. This work is not only expensive, but consumes much time, and is particularly undesirable because of its being necessary to break the joint between the standpipe and the dry pipe. With the external throttle it is merely necessary to remove the dome cap to enter the boiler, as there are no other parts which interfere, and no extra work is necessary.

With either the smokebox or smoke-tube superheater there is a large volume to be filled by steam passing from the dome to the cylinders. With the external throttle the superheater is al-

#### FOREIGN RAILWAY NOTES.

Traffic on the Baro-Kano Railway, in northern Nigeria, is developing more rapidly than was anticipated. In July, the first month after the opening of the line to Zaria, \$16,000 was taken in cash. The line from Zaria to the Bauchi plateau will probably be completed as far as the Kogin Rahanna river, about 95 miles, before the end of the year. When the bridge over the river has been completed there will be no further serious obstacle except heavy earthwork on the extension to Ngell.

During 1912 the Russian ministry of ways and communication proposes to make surveys for a new line which will run from



Buck External Locomotive Throttle Valve.

ways filled with steam and because of the small volume in the short pipes between the throttle and the cylinders the locomotive responds to the movement of the throttle more quickly than with the old form of throttle. This is particularly advantageous in spotting locomotives on turntables, in engine houses and at water stations; also in coupling with cars, especially when it is desired to make a careful coupling, as such stops frequently require an emergency application of air which is detrimental to the air brake equipment. There is no stuffing box, gland or packing for the rod in the cab. With the external throttle superheaters are always charged with dry steam ready for delivery direct to cylinders. The engine is, therefore, quicker in starting and the superheater and its joints are protected from the effects of the hot gases.

Orel, about 200 miles south of Moscow, to Narva, on the Gulf of Finland, and passing through Believ and Staraja Russa. This line will traverse a district, which for the most part is poorly served by railways, and will afford the Orel and Trans-Orel districts a communication with St. Petersburg, which will be from 43 to 50 miles shorter than the existing route via Moscow.

The minister of transportation and public works of Brazil has approved the plans for the extension of the Goyaz Railway from Ipamory to Antas, a distance of 159 miles, the first-named station being 122 miles above the initial station of the road. In another order further plans for the extension of the same railway from Perdicao to Palestina have been given final approval. This section of the line is to be 263 miles in length and will cost \$2,100,000 to build, according to specifications now accepted.



## Maintenance of Way Section.

CONTRIBUTIONS should be sent in promptly for the contest on Construction Kinks, which will close November 25. Descriptions of all devices or methods for handling to advantage any feature of construction or reconstruction work, except those relating to bridge and concrete work, will come within the limits of this contest. Prizes of \$25 and \$15 will be awarded for the two best contributions, and all others accepted will be paid for at our regular space rates.

NINE contributions were received in the contest on Methods of Collecting Cost Data Through the Maintenance of Way Department. The judges, Leroy Kramer, assistant to the second vice-president of the Chicago, Rock Island & Pacific; C. W. Hotchkiss, general manager, Chicago, Indiana & Southern; and G. H. Bremner, engineer, Illinois district, Chicago, Burlington & Quincy, awarded the first prize to E. R. Lewis, division engineer of the Michigan Central, Bay City, Mich., and the second prize to E. B. Fithian, assistant engineer of maintenance, Missouri Pacific, Little Rock, Ark. Other papers accepted and published in this issue were contributed by F. L. Burrell, C. & N. W., Fremont, Neb.; E. Cumberledge, L. V., South Easton, Pa.; J. A. Roland, C. & N. W., Missouri Valley, Ia.; E. M. Grime, N. P., Glendive, Mont.; P. H. Hamilton, St. L. & S. F., Pittsburgh, Kan.; J. F. McNally, A. T. & S. F., Chanute, Kan.

NOW that the heavier maintenance work for the year is drawing to a close and the forces will soon be reduced to a winter basis, it is a good thing to look back over the past season's work and note wherein there has been improvement over that of previous years. The necessity for retrenchment in many parts of the country has required strict economy and afforded a strong incentive for working out changes and improvements in handling maintenance work. There are probably but few officers in charge of such work who cannot look back on some improvement made in their departments during the past year. These may consist in better arrangements for handling a particular kind of work, improved organization of the gangs, the use of new equipment or of new tools, etc. A prize of \$25 will be paid for the best article describing such an improvement, and \$15 will be paid for the second best article. All other contributions accepted for publication will be paid for at our regular space rates. It is not necessary that the person who submits the article should have been responsible for the improvement himself, but, wherever possible, we suggest that the author give credit to the parties responsible for it. The beneficial results secured from the improvement should be stated. All papers should be in the hands of the Civil Engineering Editor of the *Railway Age Gazette*, 417 South Dearborn street, Chicago, not later than December 25.

THE article on Rolling Loads on Bridges, by Mr. Greiner, which appears elsewhere in this issue, is of interest to all railway bridge engineers. The question of the amount of increase over the present engine loading which should be provided for in bridge design is a vital one. As the writer states, bridge engineers are becoming more and more unwilling to predict the limits to which such loadings will increase, for the past history of bridge design has witnessed the surpassing of one after another of these limits, and the end does not seem in sight. For this reason, the conclusions of the author, that an E-50 loading is heavy enough to carry safely in regular unrestricted service the heaviest locomotives that can be safely operated without a complete revision of present standard clearances, will not be accepted by many engineers. Granting, with the author, that heavier power is probable on high grade divisions, many men will hesitate to say that such equipment will not be placed on

low grade divisions. The belief that an E-50 loading is not heavy enough for modern design and does not sufficiently discount the future is evidenced by the fact that a large number of bridge engineers are designing for heavier loadings, as shown in Mr. Greiner's article. These men would not feel justified in adopting the heavier loading with the increased expense for material if they did not believe they were necessary to provide for the loadings likely to be placed on the structure before the expiration of its normal life. The prominence and standing of the author in his profession properly give his article on this important subject much weight and prestige. It is to be regretted that the American Railway Engineering Association makes no provision for a discussion of the papers presented in the bulletins, as is the practice with the American Society of Civil Engineers and other large engineering societies, for the discussions frequently are as valuable as the papers, and they provide opportunity for the presentation of different ideas on the same subject. As many prominent men differ from Mr. Greiner, and as there is no opportunity for discussion through the channels of the association before which the paper was presented, it is to be hoped that our readers will feel disposed to discuss this subject in the columns of the *Railway Age Gazette*.

AT this season of the year on many roads the heaviest part of the track work has been completed and the track forces are devoting their efforts to getting everything in shape for the approaching winter. Ties have long since been put in, rail has been relaid, the ballast is in and dressed, tiling and ditching has been finished, all additions and betterments are out of the way, and section men are applying their energies to preparing for cold weather. The extra gangs have been reduced or laid off, and the work trains have been put out of commission. It is to be regretted that all roads are not in this condition. It is an unfavorable commentary, except in localities where winter is seldom severe, for a large number of ties to be going into the track at this season, in some cases being put in by extra gangs, and for gangs to be putting in ballast and doing other work which might better have been done in the middle of the summer. Much better results are secured if all the ties are put in in May or June, so that the rail can be laid in June, July and August, the tie spacing following closely behind. In this way all this class of work can be completed by September 15, or by October 15 at the latest. There is no true economy in postponing work in the spring, even though the close of the fiscal year on June 30 may make a good showing desirable; nor is it advisable to allow the work to drag through the summer until the fall, with the result that the fall work is retarded in its turn. On the other hand, it is not wise to cut down the regular section gangs until the fall work is entirely completed, although the tendency is to reduce these forces as soon as the heavy work is out of the way. There are always soft spots where the extra gangs have tamped the ballast unevenly to repair and small swings in the alinement to straighten out. If left undone these will become more serious, and after the track is frozen it will cost \$10 to do what \$1 will do in good weather. Much shimming and lining during the winter can be lessened or avoided entirely by getting the track in good shape before it freezes. Now is also the time to see that all brush and obstructions are cleared away from the culverts and bridges; that ditches are properly cleaned; that outlets as well as the ends of the tie are opened up; to get snow fences ready, and to inspect fences, crossings and cattle guards to see that they are in proper shape. Furthermore, there is always a great deal of work to be done in the way of cleaning up the ties, rail and scrap along the right-of-way, of putting in coal at the stations and of doing the many miscellaneous jobs that are turned over to the section men. The winter

is hard enough on railways when they are in the best condition, and the additional cost of doing work in frozen track easily offsets any savings from early and unwise reductions in the section forces during the fall. If they are allowed to get the track in good condition before it freezes the forces can then be largely reduced during the winter without serious detriment to the track.

#### COST DATA FOR THE SECTION FOREMEN.

**E**XPENDITURES for maintenance of way and structures are over 20 per cent. of the total operating expenses of the railways of the United States. This class of expenditures has not in the past been supervised as closely as those composing the other two big items in operating expenses—conducting transportation and maintenance of equipment. The general and division officers give the subject close attention; but the attention usually given to it by officers below the superintendent, and particularly those below the roadmaster, supervisor or master carpenter, is commonly very much less. The section foreman, who actually spends the money, seldom has been taken into consideration in this study of possible economy. Rather, he is commonly encouraged, at least tacitly, to use all the labor and material he can get to maintain his track and bridges in the best condition. The successful foreman of the past has been, perhaps, chiefly characterized by his ability to secure material and men from his superior officer; he has known that if the track rode well the matter of cost would seldom be mentioned to him. This same attitude has been common among roadmasters and master carpenters. The quality of the track has been the main consideration, and there has been comparatively little incentive to economy. Now, important economies are possible in the maintenance department; and it seems obvious that here as elsewhere when the condition of track is considered there should equally be considered what it has cost to put it in that condition. The best foreman is not necessarily the one who has the best track; he is the one who MOST ECONOMICALLY keeps up the best track.

Furnishing price lists of the various articles commonly used is one means of educating foremen to consider the money value of the material in their charge. Another means is to encourage them to keep records of the cost of the various kinds of work done that they may more fully realize the relative importance of the various jobs. Good results are obtained by furnishing them with the unit costs of similar work done by other foremen under similar conditions. In this way there may be developed a salutary rivalry in securing efficiency and economy.

To impress on the foremen the value of the tools they are using several roads now advise them regularly as to their cost either by circular or by inserting the data in a material book. It is not necessary that these price lists be revised monthly to show minor variations. If they are corrected perhaps once a year they will be sufficiently accurate for this purpose. When the foreman realizes the cost of the material he is ordering his natural tendency is to be more thrifty in his orders. Likewise, when he realizes the size of his daily payroll he is more apt to study whether he is securing full value from his men. Any work the cost of which is not constantly considered is likely to be expensively done.

How best to furnish such cost data is an unsettled question. The auditing departments of all roads assemble the charges against the different classes of work under the different work authorities or accounting divisions, but divide the figures only under the headings prescribed by the Interstate Commerce Commission. As a result but little data regarding the cost of the various items in detail can be secured, and this only after the work has been completed and most of the interest in it lost. To be of value to the men on the work such data must be compiled as it proceeds so that they may know then what it is costing and may make improvements before it is too late.

It is a general policy for the engineering department to prepare detailed estimates of the cost of work of any magnitude before it is undertaken, using unit costs based on work previously

done. The equally general practice of demanding explanations if the actual cost of the work exceeds by a small percentage the estimated cost often causes unit prices to be used in the estimates which are somewhat above the actual costs for such work. Indeed, on some roads arbitrary prices for all the common units of work are definitely fixed by instructions from headquarters, no allowance being made for local conditions; the local officers being indirectly given to understand that they are expected to charge out the authorized amounts to a given job, although to do so it may be necessary to transfer other charges to this account which have no connection with the authorized work. Such practice seems adapted to cause, not economy, but extravagance.

On most roads data is collected in the general offices of the cost of certain maintenance operations, such as steam shovel work, ballasting and rail laying, for the information of the higher supervising officers. But these reports are usually filed and no one but these officers see them. Such reports also cover but a small part of maintenance work. A good many roadmasters, supervisors and master carpenters have devised simple methods of working up data for the various details connected with their work and are furnishing these figures to their foremen with very good results, as described in the papers submitted in the contest on cost data, which are given elsewhere in this section.

Besides securing unit costs of the work he is doing, it is also advantageous to provide the section foreman with the costs of the work done by fellow foremen. For such a system to be successful the officer in charge must possess the foremen's confidence in his fairness. The possession of such figures shows the supervising officer who are his expensive men and will naturally lead to his devoting more time to showing them how they can improve their methods and reduce their costs.

One of the principal objections to the giving of comparative cost data to section foremen is that it may create a tendency to slight work in order to make low cost records. This can be prevented by proper supervision by the roadmaster or master carpenter; and undoubtedly increased watchfulness on their part will be requisite. Cost data is frequently quoted or used without adequate knowledge of the conditions governing the particular work from which it was derived; and therefore its use by section foremen should be confined to localities similar and preferably near to those where the work on which it is based has been done. Then the traffic, rail, ballast, climatic conditions and class of labor dealt with, are generally the same. The curvature and condition of the roadbed may vary from one section to another, but the roadmaster who is familiar with these conditions is able to equate for them.

In comparing the cost data of adjoining foremen the units selected as a basis should be carefully considered. In some cases the units may be selected in detail, as the cost of tie renewals, etc., with good results. Such a method was described by W. G. Dungan in the issue of the *Railway Age Gazette* of July 21, and should be successful where the satisfactory co-operation of the men is secured. Should there be any tendency toward transferring charges from one item to another to make a better showing it might be necessary to require the men to account for their entire payroll. Where records of but part of the work are kept it is difficult to prevent such juggling of accounts. On the other hand, if a comparison is based on the cost of maintenance per mile no opportunity is given for such transfers, but the benefits of a comparison of details are not gained. A roadmaster on one western road followed the system for two years of making comparisons based on the cost of maintenance per mile of track per month. Immediately after the first of each month he prepared a statement showing the amount spent for both labor and material on each mile of track during the previous month. Then, carrying this statement with him, he made a trip on a motor car over the division, noting carefully the condition of each section. On his return to the office about the fifth day of the month he prepared a statement to be sent to each foreman, in which he ranked the foremen in the order of the improvement made on their sec-



tions, considering the money spent per mile. Knowing that their ranking was based both on the general condition of the track and right-of-way, and on the amount spent to secure this general condition, the foremen entered so heartily into the work that within a few months it would frequently happen that different ones would advise the roadmaster that they could spare one or two men for a few days if they were needed elsewhere; in other words, when they got their track up in good condition they endeavored to reduce their costs. If such co-operation could be secured everywhere large savings could be made.

With the aim of learning how many roads have in either general or local use methods to provide cost data of their work for their foremen, a letter was sent by the *Railway Age Gazette* to a number of leading roads, asking regarding their practice in this respect. A study of the replies received from 34 typical roads indicates that 25 have no such system in use and no plans for any, while four are giving the subject careful consideration and endeavoring to work out some satisfactory plan. Four others, including the New York Central Lines and the Missouri Pacific, have methods in use similar in a general way to those described.

A contest on the subject of cost data was announced by us which closed October 1. Eight papers submitted in this competition are printed in this issue. A number of them describe methods in use locally under the supervision of the contributors, while those of Mr. Hamilton and Mr. McNally discuss practices which are used on many of the larger roads in keeping records of their larger work only. We desire to learn of any other methods that are in use and have proved successful, and will welcome contributions describing them.

#### NEW BOOKS.

*History of Bridge Engineering.* By Henry Grattan Tyrrell, C.E., Chicago. Published by the author, Chicago. Cloth, 6 in. x 9 in. 479 pages. 328 illustrations. Price, \$4.00.

This traces the development of bridge building from the time when logs were thrown across streams by primitive man to the building of modern reinforced concrete arches. The gradual development of this branch of engineering is traced through the Persian, Roman, mediaeval and renaissance periods to the middle of the eighteenth century. From this time bridges, including stone, pontoon, aqueduct, wooden, cast iron and steel structures are traced by types. The gradual development of the steel bridge is discussed under the different types of designs, including the simple truss, tubular and plate girder, suspension, cantilever, arch, trestle and viaduct. The final chapter is fittingly devoted to reinforced concrete bridges.

The book is interestingly written and well arranged, and contains frequent sketches and photographs of the different steps in the development of the various types. Largely non-technical in character, it is also of much interest to all civil engineers.

*Rock Drilling.* By Richard T. Dana and W. L. Saunders. John Wiley & Sons, New York. Cloth, 6 in. x 9 in. 319 pages. 127 illustrations. Price, \$4.00.

The purpose of the author was to collect in convenient form reliable and up-to-date information concerning the different factors entering into a study of rock excavation, and especially of the best methods of arrangement of the different types of drilling apparatus. Most of this data was gathered by the Construction Service Company and has not before appeared in print. The book gives extensive data records regarding the actual cost of rock excavation on many of the larger projects under way or recently completed. Especial attention is given to the methods of handling rock work on the Hopatcong cut-off of the Delaware, Lackawanna & Western as typical of drilling on land, while the methods adopted on the work connected with the improvement of the channel of the St. Mary's river are described in detail as illustrating subaqueous drilling.

#### COMPARISON OF METHODS OF LOADING GRAVEL.

The kind of material used as ballast by a railway is determined, first, by the materials available within reasonable distances; and, second, by the service demanded of the track. Broken stone, gravel, slag, burned clay, sand and cinders are each applicable to certain conditions. Sharp and angular crushed stone will carry heavier loads and is best for a line of dense traffic. However, its high first cost, and the fact that it can only be secured in certain parts of the country, greatly limit its use. The cost of maintaining rock ballasted track is also greater, because of the difficulty of working in it. Slag can be secured only at steel works, and its use, therefore, is limited to vicinities where that industry is carried on. Burned clay is employed quite extensively in certain parts of the middle west and southwest, in the gumbo or heavy soil countries. Sand and cinders are largely used along lines having light traffic and give good service in such places. Gravel, however, is the material most widely adopted for ballast on both main and branch lines. It is quite widely distributed in one form or another over the country and can be secured comparatively cheaply. It is most commonly taken from pits located on the banks of streams or along glacial moraines. In these pits the quality of the gravel varies greatly, ranging from a clean stone to a mixture of sand and gravel combined with a large proportion of clay. Very frequently it contains an iron oxide which causes it to cement or combine in large masses that have to be broken up before loading. This cementing of the gravel is very detrimental to its use under the track, as it binds in place and becomes difficult to work, while clay is equally objectionable, because it causes churning under the ties when wet.

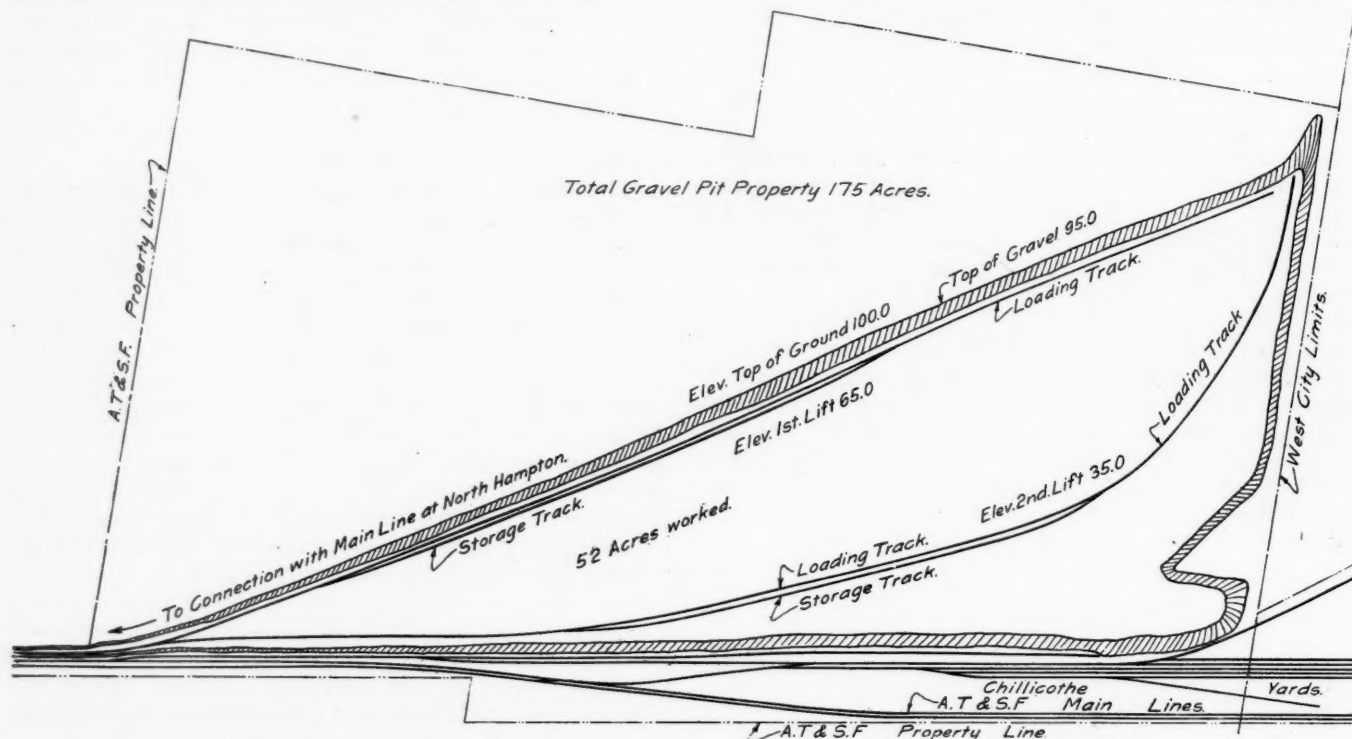
Gravel is loaded in several ways, depending on local conditions and the amount of ballast needed. When only small amounts are required cars are frequently loaded by hand or by wagons or scrapers dumping through traps. There are also several mechanical devices, such as the Torrey loader, which are frequently used in loading small quantities of ballast. When larger amounts are required the most common method is to load cars with a steam shovel working along a high bank. It often happens, however, that gravel beds are close to streams and but little, if any, above the water level. In such cases the steam shovel is not applicable, and a dredge or bucket excavator of some type is necessary. Again, it sometimes happens that the only supplies of gravel available are mixed with such a proportion of dirt or fine material as to render them unfit for ballast in their natural state, and it is possible to remove this objectionable material by washing at a cost less than would be required to secure other satisfactory ballast.

In opening a steam shovel pit a definite plan of operation should be decided on before excavation is begun, and the track lay out, as well as the location of the first shovel cuts, should be carefully determined. In an effort to secure the maximum shovel output from the start, the pit is often so cut up that economical operation later is impossible. The shovel should not be allowed to make the first cut at a grade exceeding the maximum grade allowable for an engine to pull a string of cars out of the pit. Neither should it be allowed to cut in and out of the face of the bank, but, if necessary, short and irregular cuts should be taken at first in order to finally secure a long, straight face to work against. When once this face is in good shape the increased output will justify the early delay and higher first cost of operation.

Where a pit is in continuous service it will usually be found economical to keep a small track gang in it to maintain the track in safe condition and to throw the loading track into the bank following each cut of the shovel. While the tendency is to do as little work as possible on such tracks, it is necessary that they be kept in serviceable condition and that bad spots be promptly picked up, because an engine or car derailed will tie up the entire pit until it is put back on the track again. Sufficient motive

power and equipment should be provided so that the shovel will not have to wait for cars, and the storage yard for loaded and empty cars should be near the shovel and conveniently reached in order to reduce the switching delays to a minimum. It is usually advisable for one engine to do all spotting of cars for the shovel, although at the Sheridan (Ill.) pit of the Burlington, where the storage yard is some three miles distant from the pit, two engines alternately spot and haul their cars to the storage yard. Arrangements should be made to furnish water to the shovel and locomotives without delay. Extra locomotive

ing both location and material, is that of the Union Pacific at Buford, Wyo., about 30 miles west of Cheyenne. The material in this pit is really not a gravel but a disintegrated granite. It is red in color, is clean and sharp, and does not wear or churn in the track. It is already broken up and requires only a light charge of powder to loosen it ready for loading. The pit lies parallel to the main line of the railway, immediately back of the station, and the gravel is loaded by steam shovels working on two different levels. Immense quantities are available in the vicinity of Buford as well as at Sherman. These points are



Layout of A. T. & S. F. Gravel Pit at Chillicothe, Ill.

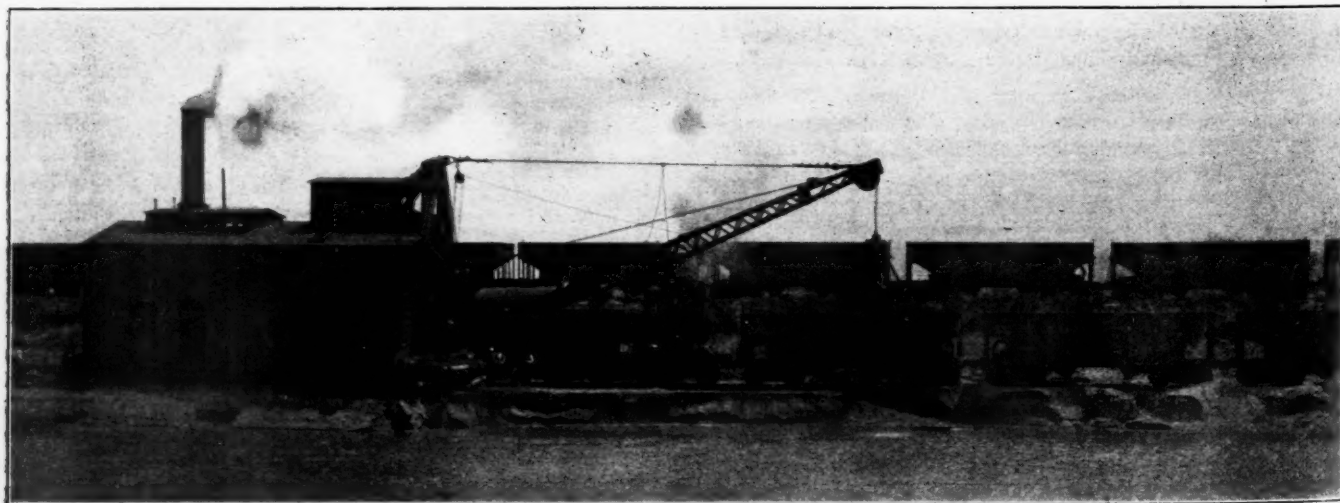
tanks or tank cars are frequently used, but these require switching as well as hauling to some water station to be filled at night. Unless near some water station where water can be piped to the pit it will usually be found economical to erect a small tank and a temporary pumping plant. Water can ordinarily be secured by driving well points down into the gravel. Such a plant requires but a small outlay and practically all the material can be recovered for other use when the pit is closed down.

#### STEAM SHOVEL PITS.

Probably the best gravel pit in the country today, consider-

located at the summit of the Union Pacific crossing, the continental divide, so a down grade haul is secured in both directions, and trains can be loaded to maximum tonnage. This feature alone results in a great economy to the road. The gravel is of such a quality that the main line of the Union Pacific is ballasted with it all the way to the eastern terminal at Omaha, a distance of 550 miles.

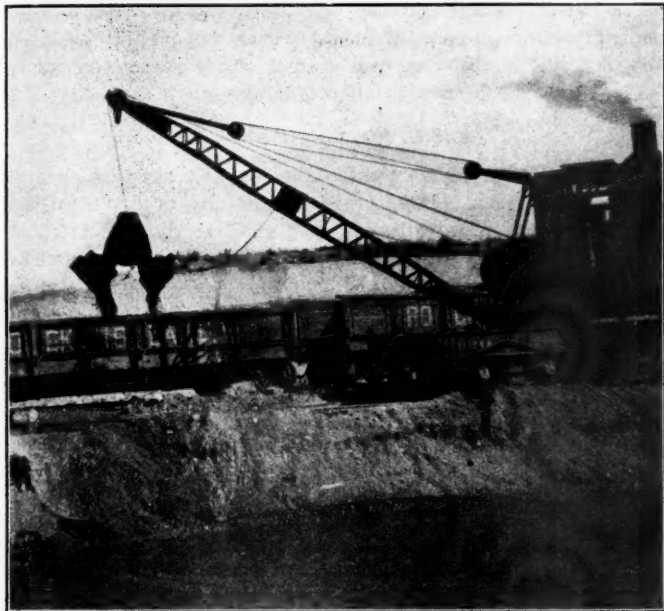
An example of a well laid out gravel pit is that of the Atchison, Topeka & Santa Fe at Chillicothe, Ill., a plan of which is here shown. This pit has been in service about 20 years, and



Orange Peel Excavator in Vandalia Gravel Pit at Terre Haute, Ind.

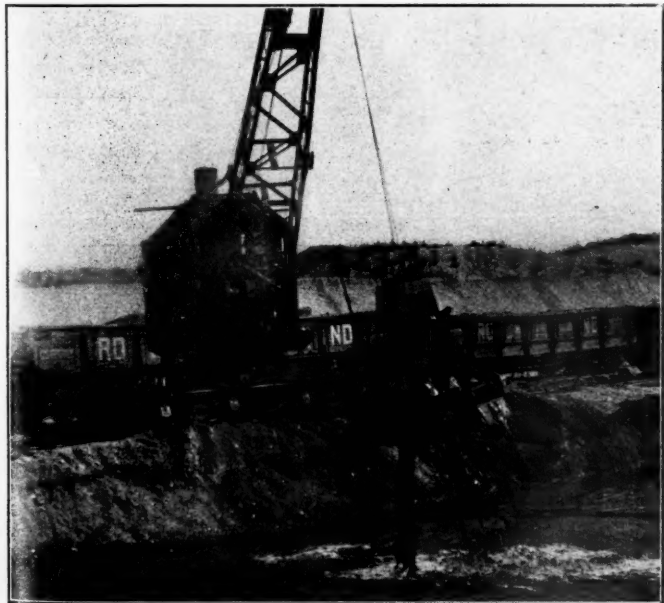


over 4,000,000 yds. of gravel have been removed. The gravel is rather fine, but it is clean, sharp and very uniform, and does not cement or churn. The stripping averages between 4 and 5 ft. The pit is located one mile west of the roundhouse and water for the shovel is piped from that point. Until recently a shovel worked on the north face against a bank varying from 30 to 60



Clam Shell Loading Gravel at Chillicothe Pit of the Rock Island.

ft. in height, and the loads were delivered to the storage yard on top of the bank by the spotting engine, the shovel remaining idle until the engine returned with a string of empty cars. During the past summer a new plan of operation was adopted, by which the pit is now worked on two levels. The shovel working along the north bank, which is about three-quarters of a mile



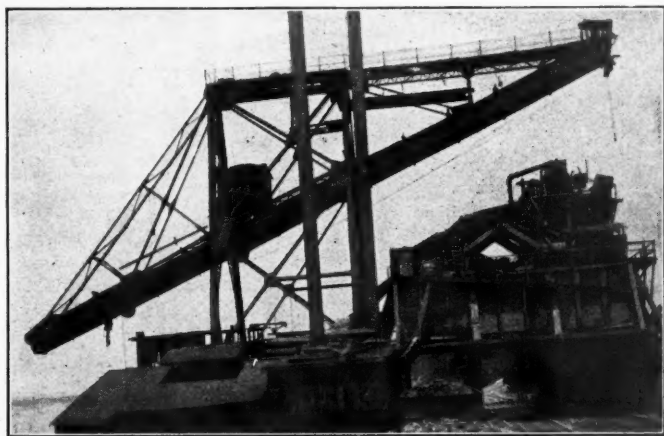
Clam Shell Excavator in Rock Island Gravel Pit at Chillicothe, Ill.

long, now cuts about 30 ft. below the surface of the gravel, while the second level is 30 ft. lower than the first. The storage tracks have been moved down into the pit and the grade of the tracks entering the pit at the west end has been reduced so that the road engines now pull their trains directly from the pit. In this way the delays to the spotting engine are greatly re-

duced and the output of the shovel is increased accordingly. When only one shovel is working, as is the case most of the time, it works on the lower level, where there is a supply of gravel sufficient to last for some time without further stripping. With this arrangement two and even three shovels can be worked in the pit should the necessity arise. It is estimated that \$3,000 is saved monthly in the operation of the pit by this re-arrangement and the reduction of grade at the entrance. One 95-ton Bucyrus shovel loads daily about 106 cars, averaging 33 yds., at a cost of about 5 cents per yd., including the cost of the land, stripping and interest on equipment. This figure is considerably below the average of other gravel pits, which will probably be nearer 10 to 12 cents per yd., and is due to the favorable conditions that exist at this pit. Gravel is hauled from Chillicothe for all the Santa Fe lines from Chicago as far west as Kansas City.

#### BUCKET EXCAVATOR PITS.

Another method of loading gravel is illustrated by the Vandalia pit, a short distance west of Terre Haute, Ind., where an orange peel excavator is used. At this pit the surface of the gravel is but 4 or 5 ft. above the Wabash river, which is a short distance away, and for this reason but little gravel could be secured by a steam shovel. The gravel is of good quality, and is the best in that vicinity. Because of these advantages in a locality where good gravel pits are scarce, it was decided to go be-



Gravel Washing Plant of the Union Sand & Gravel Company, Memphis, Tenn.

low the water level. The excavator shown in the photographs was built by the local division forces from plans furnished by the Hayward Company. The boilers and machinery are housed on a platform 20 ft. wide by 45 ft. long. Above this house is the operator's cab, in which the control levers governing all the operations of the excavator are located. The bucket is of 2½ yds. capacity, and is supported from the end of a 65-ft. steel boom on a 1¼-in. cable. It works to a depth of 35 ft. below the water level, or about 40 ft. below the surface of the gravel, and cuts a strip 50 ft. wide. The house rests on 10-in. rollers 8 ft. long, which in turn are supported on six 12-in. by 12-in. timbers. As the bank caves down in front of the excavator the machine is drawn back 14 ft. at a time by the spotting engine, to which a cable fastened to the house is attached. In this way practically no time is lost in moving. About 25 cars are loaded at each setting. About eight cars are loaded per hour, making an average of about 2,000 yds. daily, when two locomotives are used, as was done last year. The cars were stored at the connection with the main line at Macksville, about two miles distant, and one locomotive hauled while the other spotted cars at the excavator. This season a smaller amount of gravel was required and but one locomotive was used, reducing the output to 50 cars per day. Eight men, including the foreman, engineer, fireman and watchman and four laborers, are required to operate the excavator. In addition, one team is

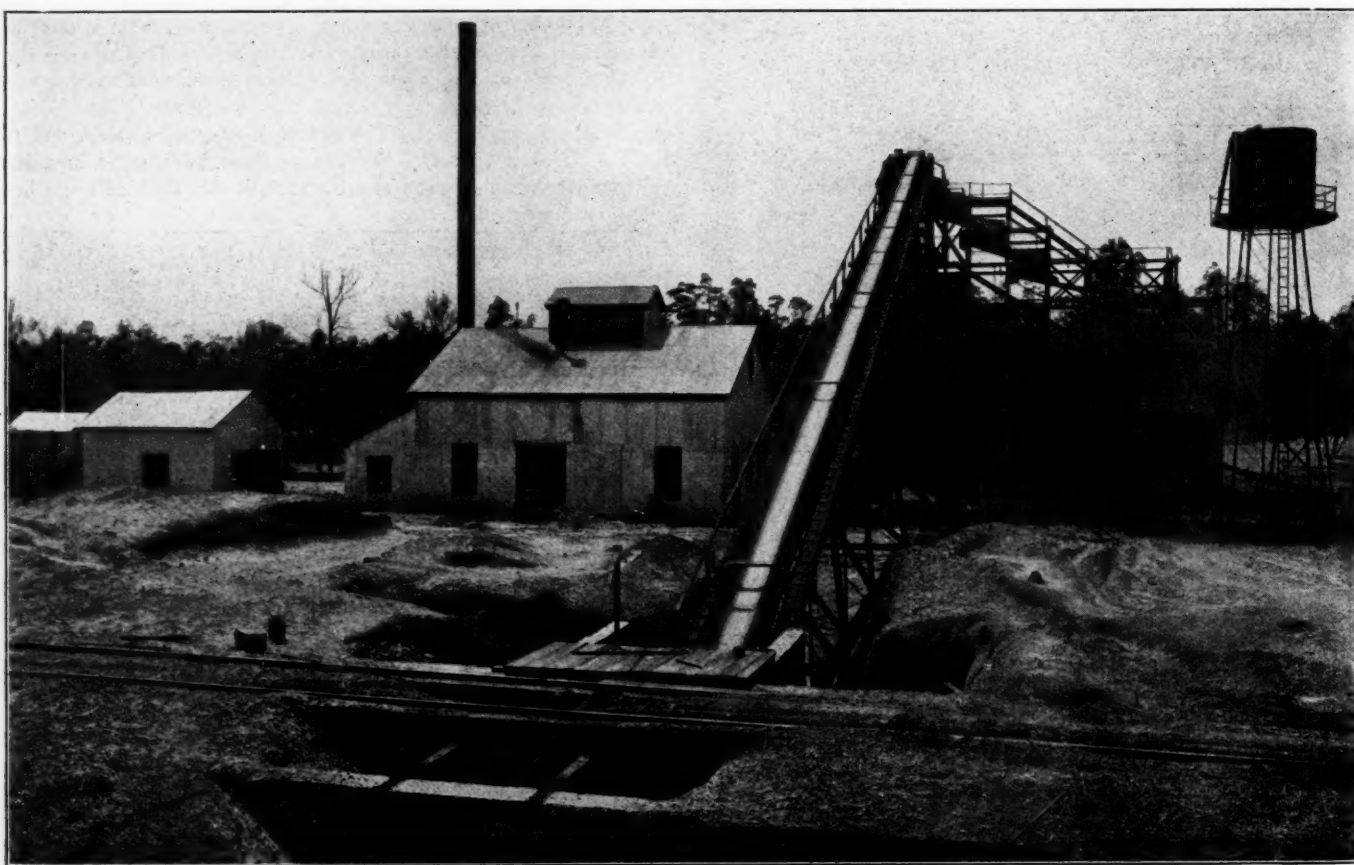
used to drag the timbers around behind the plant and do miscellaneous work. Last year over 275,000 yds. of gravel were loaded in addition to over 100,000 yds. of stripping removed by steam shovel. The cost of this stripping, including supplies, track work and repairs to equipment, was 4 cents per yard of gravel, while the gravel cost 8 cents per cubic yard loaded and placed at Macksville. This cost is somewhat below the average cost of loading with the steam shovel, considering that the cost of hauling two miles to the storage yard is included. It is impossible to separate the cost of hauling from that of the spotting at the excavator in the data given, but the combined cost of work-train service amounts to 3.8 cents of this 8 cents.

An arrangement somewhat similar to that at Terre Haute is in use at the Rock Island pit at Chillicothe, Ill., where conditions similar to those at Terre Haute exist. Here the surface of the gravel is about 6 ft. above the level of the Illinois river, which is near by. At this pit a clam shell excavator made by the Interstate Engineering Company and mounted on a 25-ft.,

be inclined to accept the figures with some hesitancy, but an analysis of the method of operation will indicate that a low cost of operation is to be expected. This type of equipment has not been generally used for the loading of gravel, although it has been used for handling coal and cinders. An advantage of the machine is that it can be put to good use during the winter in the handling of coal and cinders, and no money is thus tied up in idle equipment. It can also be used advantageously to load gravel for concrete or ballast where the quantity required does not justify the employment of a steam shovel, or where the material may be needed at irregular intervals.

#### GRAVEL WASHING PLANTS.

In some sections of the country the available supply of gravel is mixed with such a large proportion of clay or other foreign substance that it is worthless in its natural condition. At other places the only gravel to be had is river gravel, which contains a very large percentage of sand. In such cases it may be more



Hopper and Belt Conveyor at Southern Gravel & Material Company Plant, Brookhaven, Miss.

80,000-lb. capacity truck is used. The car is self-propelling and runs back and forth on a track laid along the edge of the bank, loading into cars standing on another track alongside. The excavator has a 35-ft. boom and used a  $1\frac{1}{4}$ -yd. bucket. It excavates to a depth of about 25 ft. below the water and loads about 50 cu. yds. of gravel per hour. An engineer, fireman and watchman are the entire force required to operate the clam shell, and about one-half ton of coal is used per day. No spotting engine is required, as the road engines set in the empty cars and pull the loads directly from the pit. In this way the cost of operation is reduced to a very low figure, although the output of such a machine is much less than by steam shovel.

Figures of the cost of operation of one excavator at this pit for the month of July show the following costs: Labor, \$248.87; fuel and supplies, \$38.41; total, \$287.28. The gravel loaded amounted to 11,750 yds. at a cost of 2.44 cents per yard, not including fixed charges. The shovel was out of service two days during this month. The cost is so unusually low that one may

economical to wash the dirt and fine material out and secure a gravel of the required coarseness than to use stone or other material procured from a distance. Such conditions exist along the lines of the Illinois Central and the Yazoo & Mississippi Valley south of Memphis. Accordingly, about five years ago the officers of these roads began to investigate the use of washed gravel, and finally decided to use it. They secure this gravel from four different plants, all privately owned and located at Memphis, Tenn.; Greenville, Miss.; Profit Island, La., and Brookhaven, Miss. The first three obtain their supply from the Mississippi river, while at Brookhaven a pit gravel is washed.

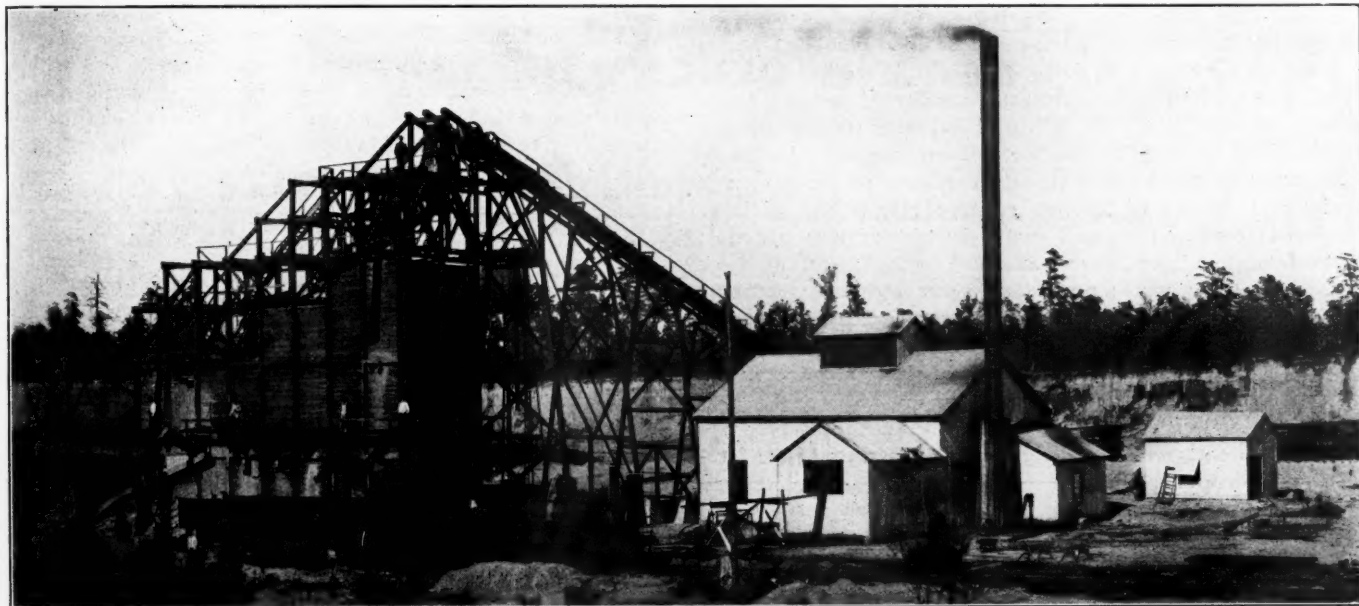
The plant of the Union Sand & Gravel Company at Memphis is in a general way typical of the river gravel washing plants. It is located on the east bank of the Mississippi river, about four miles south of Memphis, at a point where Nonconah creek empties into the river. The material is pumped from the river about two miles up stream by a suction dredge, which loads it onto barges. These barges are towed to the washing plant, and



there unloaded by a 5-yd. clam shell bucket traveling along the inclined runway shown in the photograph. This runway is composed of two I-beams and is supported on the four-post steel tower. As originally built the clam shell traveled the entire length of the runway and deposited the gravel directly onto the washing table. This has since been changed and the bucket drops the material into a hopper 18 ft. x 18 ft. x 12 ft. deep, located under the steel tower, from which the gravel is carried to the washing table by a 35-in. belt conveyor. This change shortened the length of travel of the bucket one-half, and materially increased the capacity of the entire plant, so that it now requires but a little over an hour to unload a barge. An 8-in. stream of water is thrown on the washing table, which is 12 ft. square and inclined on a slope of one foot in three. One foot below the lower end of the washing table, the first of the screens is located, and the gravel passes off the table directly onto these screens. The screens are so inclined that the material which does not pass through slides off into chutes leading to storage bins, which have a capacity of four cars each. Three grades of sand and five of gravel are collected for commercial use, while the ballast gravel is made by mixing gravel with 30 per cent. of sand, to comply with the specifications of the road. Cars are run under the different storage bins and loaded by opening small

railway about three years ago and a washing plant was erected. The gravel is loaded into standard gage hopper bottom cars by steam shovels working in the pit, and unloaded into the concrete hopper shown in the foreground in one of the photographs. The gravel is elevated to the washing table, about 87 ft. above the hopper, on a 36-in. belt conveyor. A stream of about 1,200 gal. of water per minute is turned on the table and the gravel is washed through conical screens of increasing fineness, sloping at such an angle that the material remaining on the screens falls into the proper bins. It is drawn from these bins through chutes into the cars which are spotted by means of an endless cable. About 40 cars of materials are washed daily, the ballast being mixed in the same proportions of sand and gravel as at Memphis. Two locomotives are required, one to spot cars at the shovel and one at the washery. A force of nine men is required to operate the plant, in addition to those on the engines and at the shovel.

As the washing plants are privately owned and operated, and the material is sold to the railway companies by contract, it is impossible to secure complete figures of the increase in cost of this material over the bed run. However, the cost will closely average from 40 to 50 cents loaded on cars, or about three to four times the average cost of loading directly by a shovel.



Gravel Washing Plant of the Southern Gravel & Material Company.

traps in the bottom of the bins. About two minutes are required to load each car. The entire plant is under the control of the operator located in the tower, the top of which is just visible over the shed in the foreground, from which point he can oversee the operation of the entire plant. Including this operator, the foreman and one man at the washing table to prevent blockades, 14 men are required to operate the washery. One engine is kept busy spotting cars at the plant and hauling them two miles to the Y. & M. V. main line. The ballast gravel from this plant is hauled a maximum distance of about 125 miles, until it comes within the limits of haul of the Greenville gravel. The plant was first put into operation in 1906, and washes about 1,800 yds. of gravel and sand daily.

A gravel washing plant operating under different conditions is that of the Southern Gravel & Material Company at Brookhaven, Miss. At this point the gravel is secured from a large pit. This material had been used for ballast as it came from the pit for years, but it contains a large amount of dirt and cementing material, causing it to churn badly in the track. There is such a large amount of cementing material in the upper 10 ft. that it is necessary to loosen it with powder before loading it with a shovel. This pit was turned over to this company by the

There is an advantage in the privately owned plants, in that they can so grade their material as to find sale for all of it for use in various roofing and construction work, and that not used as ballast is sold instead of being discarded. For this reason the railway can very probably purchase this material cheaper than it can wash it.

Washed gravel is much cleaner and more uniform than the average bank run and will not support vegetation. It is, however, harder to hold track to line on river gravel, because of its tendency to roll, and as it does not compact it does not furnish sufficient resistance to the lateral movement of the track.

The work of surveying the Kochui Railway in China from a point on the French railway near the port of Mengtze, in the province of Yunnan, to the tin mines at Kochui, which has been in progress for several months under an American engineer, has now been completed. The work was greatly retarded by unfavorable weather. The railway is to be 33 miles long and will be an outlet for the constantly increasing products of these mines from Goyllarisquisca to Huancayo, and from Cuzco to Puno, which now employ 18,000 men.

# MAINTENANCE COST DATA COMPETITION.

## FIRST PRIZE.—COMPARATIVE COSTS OF TRACK MAINTENANCE.

BY E. R. LEWIS,

Division Engineer, Michigan Central, Bay City, Mich.

With the idea of providing each foreman with the prices of the materials used by him and also introducing a healthy spirit of rivalry the following plan has been adopted on the Northern division of the Michigan Central: Each roadmaster is provided with a current price list of material and tools, also with a supplementary sheet of unit weights, measures and costs designed to facilitate rapid calculations of prices of small quantities of materials usually quoted in hundred weights, tons, kegs or feet board measure. These price lists are altered or renewed from time to time to suit the market changes and new standards. Each roadmaster is also supplied with a copy of a monthly comparative report showing in detail the cost of maintenance of each mile of each section on the entire division, the territory of each roadmaster being on a separate sheet, separately totaled and averaged. He thus obtains the actual comparative cost of maintenance of each mile of track under his own jurisdiction, and that of his fellow roadmasters for the foregoing month, in the following detailed order: Name of roadmaster; number of section; actual mileage of main, side, yard, industrial and other tracks, turnouts, switches and crossings in separate columns; number of miles of main track to which the total actual mileage of the section is equivalent; number of laborers employed; total cost of labor employed; cost of once-used material; cost of new material; cost of tools and equipment, including repairs; cost of track ties (separate account); cost of tie plates (separate account); total cost of labor and materials; total cost of each mile of main track or its equivalent; total of each of the foregoing items on all sections of each roadmaster's territory and average cost per mile of main track.

The cost of rails is purposely omitted because the supply and renewal is not governed to any great extent by acts of the foremen or roadmasters.

Track construction or alteration and all work not included in maintenance is handled by orders based on detailed estimates and plans furnished from the division office to roadmasters and foremen as authority for projected work. Such material as is not available from stock is requisitioned by the roadmaster or foreman through the division office. Monthly detailed reports showing progress of the work in hand under all such orders is required from foremen and sent from the division office to the assistant chief engineer.

The actual costs of such items as ballasting, fence building and any other continuous and general work being done by various gangs is scrutinized weekly from labor reports and comparisons noted to those concerned. Monthly meetings of the roadmasters with the division engineer are held in the division office when questions relative to costs are discussed. Particularly are the current comparative reports of costs per month per mile on each section and each roadmaster's territory looked into. The details of all comparatively excessive expenditures are considered and noted together with the circumstances under which the costs were incurred as explained by the roadmasters concerned.

Each roadmaster confers with his foremen concerning the report on the roadmaster's territory on his first inspection trip after the monthly meeting. A copy of this report is placed in the hands of each foreman. It is not considered necessary or advisable in this connection, to call section foremen to division headquarters for conferences, but it is designed to have the roadmasters and the material clerk meet the foremen and men resident in or near the several principal towns at convenient times to explain the meanings and intents of the reports in detail.

The division engineer spends three days per month on this work. Each roadmaster occupies an equal time on it, and the clerical force spends ten days' work for one clerk compiling, typing and distributing reports.

The increase in economy on the division during the few months the methods described have been in force, has been marked and substantial results are assured. Experience along this line has, however, proved the danger of too great pressure for increase of economy. The entire organization of employees must be educated to observe values and to keep expenses to a certain discreet minimum well within the bounds of safety.

## SECOND PRIZE—METHODS OF KEEPING COST DATA IN MAINTENANCE OF WAY WORK.

BY E. B. FITHIAN,

Assistant Engineer of Maintenance, Mo. Pac., Little Rock, Ark.

One of the best reports in general use on the Missouri Pacific for providing information concerning unit costs of various kinds of ordinary maintenance work was the "8" report, shown herewith. It presented in as concise a manner as possible, the expenditures for various kinds of work on each section, and with a little careful study the division engineer and roadmaster were able to analyze the work and its cost on each five miles of the territory. Wherever the expenditure on any particular class of work

### THE MISSOURI PACIFIC RAILWAY COMPANY, ST. LOUIS, IRON MOUNTAIN & SOUTHERN RY. CO.

FOREMAN'S REPORT OF WORK DONE FOR WEEK ENDED SATURDAY, 19\_\_\_\_  
Division. Section No. or Extra Gang No.

	Amount
A—Total hours Foreman and Laborers for week.....	.....
B—Hours used by Extra Gangs on New Work. { Do not include hours used laying rail or ballasting under this item. }	.....
C—Hours used on Main Track line and surface.....	.....
D—Hours used putting in Ties.....	.....
E—Hours used in laying Rail.....	.....
F—Hours used putting in Ballast.....	.....
G—Hours used Ditching.....	.....
FOLLOWING MATERIAL USED AND WORK DONE	
H { Include Switch ties. } Number of Ties put in Main Track....	.....
I { Counting each switch tie as one tie. } Number of Ties put in Side Track....	.....
J—LINEAL feet of Rail laid.....	.....
K—LINEAL feet of Track Ballasted.....	.....
..... Foreman.	
Headquarters .....	

NOTE.—Extra Gang Foreman must also use this Form to report material used and work done by their forces, and will show the number of the Section on which the work is done.  
All Foremen will fill out this Form Saturday evening and mail by first train to Division Engineer.

#### A B C Report.

was found to be unusual, the division engineer or roadmaster could readily locate the exact point to go on the ground to make a careful study of the situation, and could then take proper steps to bring this class of work to normal condition. For instance, on one section it was found that patrolling of track was above the average of other sections, and the division engineer, in going into the matter found that although the section headquarters were within the section limits, the foreman and laborers lived



two miles outside of section limits, because the foreman happened to own his home at that point. On other sections it was found that line and surface of main track was above normal, and investigation brought out the facts that this was chiefly due to lack of ballast, loose bolts, bad drainage and other similar conditions. This report is also valuable as a study in comparing the cost of work on one roadmaster's territory as against the territory of another roadmaster, where general conditions are about the same. For instance, line and surface of main track on one roadmaster's territory may be a large per cent. in excess of another territory where conditions are similar. Again patrolling on one territory may be greatly in excess of that of another territory, where common knowledge of conditions would justify the opposite conclusion; and a careful study would show that the roadmaster was at fault and in keeping his men running from point to point to pick up some little defect that would wait until their work took them to that vicinity. The expenditures of going to and from work will average about 12 per cent. of the labor charges on track maintenance, and as this is an expenditure from which the railway company derives no benefit, it should be given very careful study with the object of reducing it to the lowest possible minimum.

Another report in common use, is the "A. B. C." report a copy of which is attached. From this report the roadmaster can keep

able data to the division engineer in assisting him to keep in touch with his work and its progress, but also a good thing to give the roadmaster to circulate among his foremen, to give them a knowledge of what they are accomplishing, and also what the other men are doing.

PROGRESS OF BALLASTING WORK FOR WEEK ENDING —			
Ex-gang.	No. of hours worked.	Feet of track ballasted.	Feet per man per day.
No. 1 .....	2,400	8,400	35
No. 2 .....	1,800	6,840	38
No. 3 .....	2,100	8,400	40
Division .....	6,300	23,640	37.5

A similar report for rail laying gangs is also productive of good results, and should be headed as follows:

PROGRESS OF RAIL LAYING FOR WEEK ENDING —				
Ex. gang.	No. of hours worked.	Feet of rail laid.	Feet of rail per man per day.	No. of switches laid.
No. 1 .....	2,100	31,500	150	1
No. 2 .....	6,000	60,000	100	4
No. 3 .....	3,600	43,200	120	2
Division .....	11,700	134,700	115	7

In addition to the above we keep a record of expenditures against each structure. In the fall of the year, an inspection is made of each structure itemizing the work to be done, giving an estimate of cost to do the work, segregating it into material and

## MISSOURI PACIFIC SYSTEM.

RECORD OF SECTION LABOR FOR \_\_\_\_\_ AND \_\_\_\_\_ INCLUSIVE.  
DIVISION. \_\_\_\_\_ ROADMASTER. \_\_\_\_\_  
To \_\_\_\_\_

SECTION NUMBER and LOCATION	PERIOD	SUB-ACCOUNTS																		
		TRACK MAINTENANCE					APPLYING TRACK MATERIAL				ROADWAY POLICING						Remove Snow and Ice	Flood Damage	GENERAL CLEANING	
		TOTAL	M. Track Line and Surface	S. Track Line and Surface	Gauging	Respacing	Rails	Ties	Ballast	Other Material	Patrolling and Watching	Care of Roadway	Refuse Material	New Tracks	Bank Protection	Filling			Cleaning Right of Way	Cleaning Tracks
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or abutments and piers for a bridge it is a more difficult matter for the foreman to make a report which will enable the office man to readily determine the cost of labor on the various parts of the work, such as dry excavation, wet excavation, forms, reinforcing steel, concrete, backfilling, etc. The foreman should be given some kind of a form to follow so that he will not be burdened with a great amount of bookkeeping when he should be devoting his time to important details of the work in progress. To accomplish this I have given my foremen the following outline for use in designating the several kinds of work in the small daily time book: Dry excavation, "D"; wet excavation, "W"; carpenter work on forms, "F"; handling gravel, including unloading from cars, wheeling to mixer, etc., "G"; handling cement in and out of storage and to mixer, "P"; pumping water or any work in connection with your water supply, "L"; placing reinforcing steel, "S"; concrete, including mixing, wheeling to place, spading, protecting from frost, etc., "C"; any other items which cannot logically be placed under any of above heads, "X."

Now assume that Frank Jones, laborer, works ten hours on the 23d of August; Three hours of this time he was working on dry excavation, two hours on wet excavation, one hour shoveling gravel and four hours wheeling concrete. The time book would show opposite his name under this date; 3 d, 2 w, 1 g, 4 c. This, of course, is an extreme case, as ordinarily a man will not work on more than one or two different kinds of work during the day.

At the end of the month, or when the work is completed, it is an easy matter for the foreman to add up the hours of work for each man under each heading and thus have an accurate distribution of his time to the various parts of the work and likewise the sum of all the hours in each class gives the total distribution and cost, and the foreman's time can then be distributed in proportion.

In connection with this the foreman is instructed to give the following information:

1. Distance from base of rail to surface of ground before starting excavation.
2. Thickness of first and each succeeding stratum of material encountered and nature of same.
3. Total depth to bottom of excavation.

From the plans of the structure and the usual inspections while the work is in progress it is then an easy matter to determine the volume of each kind of excavation, the cubic yards of concrete, weight of steel, feet board measure of forms, etc., and the matter of getting the unit costs of any particular structure requires but a short calculation. A sample page herewith shows how this method can be adapted to the ordinary time book, but if one were to handle a large amount of this class of work it would be best to have a special time book printed, giving the various letter headings.

A comparison of figures of this kind from several foremen will readily show the weak points in any foreman's organization, taking into account, of course, the natural conditions at each particular piece of work. The practice of furnishing to all the foremen the unit cost data on all the work in progress tends to make each foreman strive to improve his own work and bring the unit costs down to a minimum and the cost figures obtained are exceedingly valuable when making up estimates for new work.

#### MONTHLY PAYROLL SHOWING UNIT COSTS.

BY E. CUMBERLEDGE,

Division Accountant, Lehigh Valley, South Easton, Pa.

The possession of unit costs of track maintenance must be equally as beneficial to a good organization as the unit costs of operation, but this feature appears to have been almost entirely overlooked up to this time, possibly due to a knowledge of the inferior quality of the labor on which we would have to rely for the basis of our calculations. Today the plea of those in charge of maintenance of roadway is that too much clerical work and too many records are required of the section foremen, causing a tendency on his part to neglect the work for which he

was employed, that of supervising the maintenance of track. This contention, although well taken is partially removed where assistant section foremen are engaged, and my opinion is that we should insist on obtaining data bearing on primary maintenance operations at the time gang foremen submit their payrolls. A form of time sheet can be readily devised which will give in addition to the payroll and distribution, the amount of work done on certain items on which unit costs are desired. A report of this kind could also be used to advantage in another direction. Every section foreman makes monthly reports showing the material used on maintenance work and experience in the past has taught that the tendency is for the foremen to overlook reporting certain material used, as rail, splices, bolts, nutlocks, etc., with the result that when inventory is taken, the book record of stock is in excess of the record of material on hand, but with the payroll referred to and the foreman knowing it to be the basis of establishing his efficiency he will be determined to report all material used which would be checked against his record of stock disbursements, and so avoid any explanation necessary should the inventory produce either overage or shortage in material.

This record obtained from, say 50 section foremen one day after the close of each month, could be readily drawn off in comparative form, material used checked with disbursement records, unit costs computed, and the required copies made and forwarded to all foremen and interested officers by one clerk in 15 hours. Good results are unquestionable, for comparison of efficiency if known by the foremen compared, breeds competition or an incentive on the part of one to outdo the other. However, when making this comparison conditions under which work was carried out must be carefully considered and furthermore the supervisor must be ever alert otherwise low immediate costs may result in more disastrous expenditures at a later date. This feature could, however, be just as readily handled as in the operating department where the knowledge of unit costs has proved beneficial without detriment to service.

Another practice which I know has helped in reducing maintenance costs, is to place extra laborers under the jurisdiction of the section foreman when occasion arises, instead of placing extra gangs on a section subject to direction from an extra gang foreman. An extra gang foreman and his men are what might be termed floaters. They lay rail today on section 10, and the foreman's only object is to get it down. Tomorrow he is on section 40, where he has the same object mainly in view, with the result that shortly after the extra gang has left, the section foreman is obliged to leave his current work to reline the track the extra gang foreman had taken no interest in, since he felt that his responsibility ended when he and his gang left the vicinity. Work done and done well is more likely to be obtained by this suggested practice. Low costs depend on the efficiency of the man in charge, and to assist in determining this efficiency unit costs must be obtained.

#### DIFFICULTIES OF USING COMPARATIVE COST DATA.

BY P. H. HAMILTON,

St. Louis & San Francisco, Pittsburg, Kan.

On this railway the roadmasters report direct to the superintendent. Each roadmaster receives a monthly allowance for track maintenance and he is required to keep his expenditures within that amount. Before giving the foremen their allowances the roadmaster sets aside what he estimates will cover the material that the foremen will use. He divides the balance up among the foremen in proportion to what he thinks they will need, referring to the record of previous expenditures for labor, and to his knowledge of existing track conditions on the various sections. They are cautioned about the excessive use of material and use only what is necessary to keep their track in shape, always releasing scrap material. If a foreman finds it necessary to use an unusual amount of material he notifies the roadmaster, who

arranges to take care of this expenditure so as to keep within his allowance. Some foremen having the same amount of track as others are allowed more labor on account of local conditions, such as poor drainage, light rail, poor road bed, etc., which necessitate additional work.

Each foreman is required to make a weekly report to the roadmaster showing the total amount expended for labor, and showing the material used and released. The cost of the material used is figured out in the roadmaster's office, so that the roadmaster knows how much has been spent on his sub-division during the week, and is in this way able to keep within his allowance. The roadmasters wire this information to the superintendent's office, where it is combined and the superintendent knows how the cost of track maintenance is running, and he is able to keep within his allowance.

At the end of the month, when the accounts are closed, a comparison is made showing the average cost per mile of track (exclusive of rail and ties) on each roadmaster's sub-division. No accurate information is secured if these figures are accepted as final. For each district the traffic, weather conditions, grades, location, and other important local conditions must be taken into consideration in making the comparison or the figures will amount to nothing.

It is the same way with the roadmaster and his sub-division. If he takes straight figures as his rule for comparison of the work of the different section foremen he will not be able to get any benefits. One foreman may have a much harder section to keep up. Possibly he has light rail, and as heavy equipment running over it as the foremen with the heavy rail. His section may run through marshy country where he is troubled with soft spots and sinks, while another section runs through prairie country where the track is laid on a solid foundation. Possibly the class of labor he gets is poor; and there may be numerous other conditions that he has to contend with that the other foremen have not. All of these things must be taken into consideration. When this is done it is hard to decide which foreman is doing the cheapest and best work; and the personality of the man usually becomes the deciding point.

In the roadmaster's office a recapitulation of the foremen's labor distribution is made out each month showing the number of hours charged to the various accounts as prescribed by the Interstate Commerce Commission, and this recapitulation is compared with the previous month and the corresponding month the year before.

These statements are filed for future reference, and a comparison of any two sections can be made at any time. At different times we have had the section foremen send in daily statements showing the number of hours charged to various kinds of work and the amount of work done. These reports, however, did not produce any good results, as we had to rely on the foreman's honesty as to the correctness of his report. I do not mean to insinuate that the track foreman is any more dishonest than any other class of men, but it is easy for him to "fudge" his reports a little. For instance, he can charge to account No. 6-c the extra time that he used in putting in a number of ties, making his charge to account No. 6-b-2 agree with the other fellow's. The roadmaster has no way of finding out the correctness of the charge to account 6-c. Neither can he check the charge to 6-a when a gang is not surfacing out of face. We have also found that daily comparative statements have a tendency to make the section foreman careless as to the quality of the work that he turns out; as quantity, not quality, is what he is after. He forgets all about the quality of his work in his zeal to out-do the other foremen; and as it is impossible for the roadmaster to inspect all of the section foremen's work it brings bad results. With an extra gang it is different. Where such a gang is engaged in one line of work for several days at a time it is an easy matter to keep a check on what the foremen are doing as well as on the cost of their work by having them send in daily reports.

## COST DATA IN THE BRIDGE DEPARTMENT.

BY F. L. BURRELL,

General Foreman, Bridges and Buildings, C. & N. W., Fremont, Neb.

I have followed the plan for several years of having the foreman of each gang make a daily labor report of work done on a form 6 in. wide by 9 in. long. Space is allowed on this form for the number, name and classification of each employee; rate of pay; total hours worked; structure upon which he is employed, and detail of the time employed on each part of the work. This requires an extra amount of work by the foreman, who is, however, better enabled to keep track of the cost of the work and the men employed. It also forces him to make a comparison of the men under him, and he soon finds out which man is doing the most efficient work.

The plan is of benefit to the head of the department, when conflicting duties prevent personal inspection, as it allows him to see each day just what has been done and how far along the work has progressed. It also enables him to decide, in a measure, whether or not the foreman is competent to judge the ability of the men under him. A foreman may be a good worker, but a poor judge of the ability of his men to do efficient work. This method puts him in direct touch with the work of the men individually, and he cannot fail to see that all are doing their part in an intelligent manner. If he sees that one man is all motions and makes little headway he begins to study him; and, if

### DAILY LABOR REPORT

Sept. 14th 1911.				
No.	NAMES	HOURS	RATE	STRUCTURE
1	Forman	85	Mo	Framing Sills 1 1/2 H, framing posts 1 H, placing posts 7 H
2	Leader	30	H	Sizing Sills 2 H, placing Sills 3 H, placing posts & caps 5 H
3	Carplet	27 1/2	s	Framing Sills 2 H, posts 6 H, caps 2 H
4	2nd	22 1/2	s	Raising Girders 2 H, blocking 2 H, tearing out posts 6 H
5	Hlpc	s	s	" " 1 H, putting in caps 7 H, " " 2 H
6	"	s	s	Cutting & taking out bolts 5 H, tearing off siding 5 H
7	"	s	s	Unloading Material 1 H, putting in bolts & anchors 3 H
8	"	s	s	Framing Sills 2 H, posts 6 H, caps 2 H
9	Labour	20	s	Picking up old Mat 1 1/2 H, sharpening tools 2 H, flagging trains 3 H
FOREMAN				

Bridge Work Labor Report.

a good foreman, he will show the man a better way to do the work. If his efforts are not appreciated it is his duty to remove the man.

It has been my practice to have the men gather at the district headquarters every Sunday morning, unless they were too far away, to talk over the work of the past week. In the course of the discussion the attention of one man may be called to the fact that his work has been pretty expensive; and he is shown the daily reports from another man who has a bridge of the same height, and a gang of the same number of men at the same rate; who has done the work at a cost of from 10 to 12 per cent. less. He is then shown that he has not been paying as much attention to the details as he should; and perhaps has been trying to do too much of the work of the men, while they stood around watching him. This report also shows, for instance, that a 30-cent man was excavating for the purpose of stubbing a pile when he should have been up on the bridge framing the stringers which were to be replaced, and the foremen's attention can be drawn to the matter of proper organization.

All the foremen can now tell very closely what it will cost to do any unit of work of their respective classes of trestle, concrete or steel bridge work. They have gone so far as to keep detailed statements in special books, showing what each man under them has done in the past three years; and they frequently call my



attention to some step taken by a certain employee, to make the work cost more or less than usual.

As these reports are sent in daily, the office clerk makes his monthly distribution of labor from day to day; at the end of the month the labor distribution has been made, and is ready for the auditor. The foremen are given the prices of the class of lumber that is used in their work, and as they use the material they make the estimates of the cost of the structure, and can tell very closely whether or not they have done a reasonably economical piece of work.

So far as the keeping of the record of the cost of the labor is concerned, this does not require a large amount of time or clerical work. While the foreman is keeping the men in line he notes the work they are doing and sets it down.

#### METHODS OF PREPARING COST DATA IN MAINTENANCE WORK.

BY J. F. M'NALLY,

Assistant Superintendent, A., T. & S. F., Chanute, Kan.

We have in use a mimeograph blank on which the extra gang foremen wire in to the roadmaster each night the amount of work done that day, the different operations being designated by letters to reduce the amount of telegraphing. With this report the superintendent, roadmaster or general foreman can tell just what the gang is doing and what it is costing to perform the work. By handling the work in this manner it is not necessary to wait to get the information from the auditor's office, as it is impossible to secure the information from his office until after the time books have been checked by the superintendent's office and registered up by the auditors. If the work is completed about the 10th of the month the superintendent or roadmaster can check over their ledger in a short time and obtain the desired information as to cost of the work.

These blanks have proved very satisfactory and enable the men in charge of the work to keep a close check on the amount of work done each day. We have just completed laying and surfacing 100 miles of new 90-lb. rail on the Southern Kansas division and we found these blanks very beneficial to us in keeping a check of the cost per mile. At the end of each day's work our foremen of the steel and surfacing gangs would fill out this report and wire it in to the division headquarters, and we would have the information in the general superintendent's office the following morning.

It is surprising to note the interest that these extra gang foremen take in increasing their daily output of work, as each foreman tries to see if he cannot do a little more that day than the others. We sent each extra gang foreman a statement at the end of each week showing the amount of work performed that week, giving number of feet of steel laid or surfaced and ties inserted and spaced.

We experienced some little difficulty with our foremen, when we first put this report into effect, on account of the tendency to crowd their men and slight their work, as each one would try to make a little better showing than the others. It became necessary to caution the roadmasters to personally watch the work and see that it was not slighted. I think that it is a great benefit to all foremen who have charge of large gangs to send them a report each week of the amount of work they have accomplished.

Bulletin No. 49 of the University of Illinois Engineering Experiment Station, just issued by Professor A. N. Talbot and Assistant Professor H. F. Moore, contains a detailed record of tests of nickel-steel riveted joints. The investigation included tests in tension and in alternate tension and compression. The bending of rivets, the deformation of the joints and the slip of the plates, the yield point of the joints, and the ultimate strength of the riveted joints, were noted.

#### ROLLING LOADS ON BRIDGES.\*

J. E. GREINER,

Consulting Engineer.

Coincident with the introduction of a particularly heavy type of locomotive is always the question as to whether bridges are being constructed of sufficient strength to safely carry this heavy engine and its possible future development. This same question has been cropping out time and time again during the past thirty years or more, and the answer has heretofore frequently been evidenced by the construction of somewhat stronger bridges, but in many cases to an extent merely sufficient to anticipate the increasing weight of rolling stock for a very brief period.

During each successive revision of the specifications it was believed that the practical limits of locomotive weights and car capacities had been fully anticipated, but the fallacy of this belief has been demonstrated so frequently that now few engineers feel inclined to assert, with any degree of confidence, at what point or at what time this development will have reached its limit. It is apparent that we have not yet passed the period of expansion and development, and the question as to whether the structures now being built are of sufficient strength depends entirely upon future development in the type and weight of the rolling stock and the accuracy with which the designer has anticipated this development.

#### HEAVIEST LOCOMOTIVES.

Since about 1835, when the first bridge was built for carrying trains, locomotives have developed from the miniature 4-wheel grasshopper weighing less than 22,000 lbs. to the enormous 24-wheel articulated type weighing 616,000 lbs.

About 20 years ago the heaviest engine in service on the Baltimore & Ohio was a consolidation weighing about 134,000 lbs.; at the present time this road has articulated engines weighing 463,000 lbs. Similar increases have taken place quite generally on other roads.

The heaviest locomotives in actual service on 36 American railways are given in Table 1, which table also indicates contemplated increases.

TABLE 1.—HEAVIEST LOCOMOTIVES IN ACTUAL SERVICE ON 36 AMERICAN RAILWAYS.

Railway.	Locomotives in Service.		Under Consideration.	
	Type.	Weight, Lbs.	Type.	Weight, Lbs.
N. Y., N. H. & H.	Pacific	229,500	Pacific	235,000
B. & M.	Pacific	Equal to E-43		
N. Y. C. Lines	Pacific	266,100		
Erie	Consolidation	260,100	Mikado	305,000
P. R. R.	Pacific	269,800		
L. V.	Pacific	241,400		
P. & R.	Consolidation	222,000		
B. & O.	Mallet	463,000		
N. & W.	Mallet	400,000		
C. & O.	Mallet	392,000	Mallet	400,000
Virginian	Mallet	455,000		
S. A. L.	Consolidation	212,000		
Southern	Mallet	366,000		
A. C. L.	Consolidation	171,000		
L. & N.	Consolidation	224,000		
Wabash	Consolidation	223,800		
B. & L. E.	Consolidation	254,000		
I. C.	Consolidation	223,000	Mikado	280,000
Pere Marquette	Consolidation	217,000		
M., St. Paul & S. S. M.	Pacific	253,800		
C. & A.	Mallet	323,400		
C. & N. W.	Pacific	238,000		
Great Northern	Consolidation	216,600		
C., M. & St. P.	Mikado	260,500		
C., B. & Q.	Mallet	354,500	Mallet	463,000
A., T. & S. F.	Double Santa Fe	616,000		
C., R. I. & P.	Consolidation	238,900		
N. P.	Mallet	435,200		
M. P.	Pacific	251,000	Mallet	?
S. P.	Mallet	437,000		
St. L. & S. F.	Mallet	416,000		
M., K. & T.	Pacific	228,000		
Grand Trunk	Consolidation	211,200	Mikado	275,000 abt.
Canadian Pacific	Mallet	261,900		
C. N.	Consolidation	181,400	Consol.	?
N. Rys. of M.	Mallet	338,000		

The increases from the 22,000-lb. grasshopper used on the Baltimore & Ohio in 1835 to the articulated type weighing 463,000

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lbs. has been rapid and remarkable, and is illustrated by the following data, which shows the heaviest engines in actual service on the Baltimore & Ohio Railroad from 1835 to date:

Type.	Date.	Weight.
Grasshopper	1835	22,000 lbs.
Winans' camel, 8-wheel	1851	74,600 lbs.
Perkins' 10-wheel	1863	90,800 lbs.
Consolidation	1873	105,200 lbs.
Consolidation	1881	108,600 lbs.
Mogul	1886	113,200 lbs.
Consolidation	1887	115,600 lbs.
Consolidation	1888	125,000 lbs.
Baldwin, 10-wheel	1890	133,000 lbs.
Consolidation	1892	134,200 lbs.
Consolidation	1894	160,800 lbs.
Electric motor	1895	190,000 lbs.
Consolidation	1905	208,500 lbs.
Pacific	1906	229,500 lbs.
Articulated	1911	463,000 lbs.

The above shows an increase from 133,000 lbs. in 1890 to 463,000 lbs. in 1911, which is about 248 per cent. in the past 21 years. There are much heavier engines in use on other roads.

The maximum axle load in 1835 was 5,500 lbs., while at present it has gone beyond 65,000 lbs., with limit not yet reached.

#### BRIDGE SPECIFICATION REQUIREMENTS.

The specification loading for bridge design as now in use by the various railways is given in table 2, which table also gives the impact allowances and permissible unit-stresses. The simplest manner of comparing these various specified loadings, including their different impacts and unit-stresses, is by reducing them to an equivalent loading on the basis of the American Railway Engineering Association specifications. These specifications provide for a consolidation type of engine known as Cooper's E-40, E-50, E-60 series, depending upon whether the weight on each driving axle is 40, 50 or 60,000 lbs. The equivalent loading given in the sixth column of table 2, therefore, means that the specified loading, impacts and unit-stresses, as adopted by the various railways, are practically equivalent in their effects on bridges to the Cooper's E series loading noted, when used in connection with the American Railway Engineering Association specifications.

TABLE 2.—BRIDGE SPECIFICATION LOADING.

Railway.	Engine.		Impact.	Tensile Unit.	Equiv. Load-ing.	Proposed Changes
	Type.	Weight 1,000 lbs.				
P. R. R. West.	Excess	60.0	.....	7,000 (1 + $\frac{M}{M}$ )	E-65	10%
N. Y., N. H. & H.	E-60	270.0	A.R.E.A.	16,000	E-60	.....
A. C. L.	"	270.0	"	16,000	"	.....
B. & L. E.	"	270.0	"	16,000	"	.....
Pere Marquette.	"	270.0	"	16,000	"	.....
C. C. & O.	"	270.0	"	16,000	"	.....
G. N.	"	270.0	"	16,000	"	.....
C. & O.	Artic.	468.0	"	16,000	"	.....
C., B. & Q.	Consol.	252.0	Special	10,000 (1 + $\frac{D}{D+L}$ )	"	.....
A., T. & S. F.	"	291.0	.....	Special	"	.....
W. Md. Ry.	Artic.	488.0	Special	16,000	"	.....
P. & R.	E-55	247.5	A.R.E.A.	15,000	"	.....
S. P.	Consol.	240.0	.....	Special	E-57	.....
N. & W.	Special	275.0	Special	15,000	"	.....
Virginian	E-60	270.0	A.R.E.A.	17,000	"	.....
C., M. & St. P.	E-55	247.5	.....	Special	"	.....
Southern	E-55	247.5	A.R.E.A.	16,000	E-55	.....
I. C.	"	247.5	"	16,000	"	.....
C. & N. W.	"	247.5	"	16,000	"	.....
C., R. I. & P.	"	247.5	"	16,000	"	.....
St. L. & S. F.	"	247.5	"	16,000	"	.....
Nat. Rys. of M.	E-60	270.0	.....	Special	"	.....
C. & A.	E-50	225.0	.....	Special	"	.....
N. Y. C. Lines.	E-60	270.0	A.R.E.A.	18,000	E-53	.....
B. & M.	E-50	225.0	A.R.E.A.	16,000	E-50	.....
Erie	"	225.0	"	16,000	"	E-60
Wabash	"	225.0	"	16,000	"	.....
M. P.	"	225.0	"	16,000	"	E-55
M., K. & T.	"	225.0	"	16,000	"	.....
Grand Trunk	"	225.0	"	16,000	"	.....
Can. Pac.	"	225.0	"	16,000	"	.....
B. & O.	"	225.0	"	16,000	"	.....
M., St. P. & S. S. M.	E-55	247.5	.....	Special	"	.....
L. & N.	Consol.	232.0	A.R.E.A.	17,000	"	E-53
N. P.	"	233.0	.....	Special	"	.....
L. V.	E-50	225.0	.....	Special	E-47	E-60
S. A. L.	"	225.0	A.R.E.A.	17,000	"	.....
C. N.	Consol.	211.5	Special	16,000	"	.....
P. R. R. East.	Pacific	292.0	Special	16,000	E-45	Mallet

This table also shows changes under consideration by a number of railways. It will be observed by reference to the table, column 6, that eleven roads are building bridges for a strength practically equal to E-60 bridges, four for E-57, seven for E-55, one for E-53, eleven for E-50, four for loads under E-50 and one for loads over E-60. Of those roads which are now designing bridges for E-50 or under, two propose the change to E-60 and three to loading in excess of E-50 in the near future.

It may be reasonably assumed that the specifications in force, or the proposed changes, represent the views of the engineering departments of the various railways relative to the sufficiency of the present requirements for meeting future conditions, and on this assumption—one road considers E-65 insufficient, 13 roads consider E-60 sufficient, 15 roads consider E-55 sufficient, and ten roads consider E-50 sufficient.

In order to determine the relative effects, on bridges, of the various heaviest types of engines in service and the usual specification E-50 and E-60 class, the maximum shearing and bending stresses produced by each type were calculated for spans ranging from 10 ft. to 100 ft., all locomotives, excepting the articulated types, being considered as running double-headers drawing a train of 5,000 lbs. per foot of track. On the assumption that the maximum stress produced by E-50 class is represented by unity, the proportional maximum stress produced by the various locomotives on bridges under 100 ft. is given in table 3.

It is fortunate for our bridges that the stresses produced by the heaviest engines are not in direct proportion to the weight as compared with E-50 type. For instance, the 24-wheel articulated engine weighs 174 per cent. more than E-50, but produces increased stresses varying from 15 per cent. to 33 per cent. The 20-wheel articulated type weighs 112 per cent. more, while the stresses are increased only from 1 per cent. to 14 per cent. Other engines which weigh considerably more than the E-50 produce stresses ranging from 83 per cent. to 116 per cent. of those caused by the E-50, and the excess stresses are mostly in very short spans. The above refers to spans under 100 ft. For greater lengths the stresses will in many cases be less, and in no case will they be in excess of those mentioned above.

TABLE 3.—RELATIVE STRESSES PRODUCED BY HEAVIEST LOCOMOTIVES—SPANS 10 FT. TO 100 FT.

Class.	Actual Weight.	Proportional Weight.	Proportional Stress.	
			From	To
E-50	225,000	1.00	1.00	1.00
Artic.	214,800	0.96	0.83	1.15
Prairie	244,700	1.09	0.88	1.03
Consolidation	260,100	1.16	0.99	1.14
12-wheel	262,000	1.17	1.00	1.14
Decapod	267,000	1.19	0.96	1.07
Pacific	270,000	1.20	0.93	1.08
Mikado	305,000	1.36	1.02	1.16
12-wheel articulated	334,500	1.49	0.98	1.15
10-coupled	361,000	1.60	1.00	1.26
20-wheel articulated	478,000	2.12	1.01	1.14
16-wheel articulated	493,000	2.19	1.26	1.34
24-wheel articulated	616,000	2.74	1.15	1.33
12-wheel electric motor	300,400	1.33	0.83	0.98
16-wheel electric motor	320,000	1.42	0.84	0.93

#### CAPACITY OF BRIDGES.

All bridgemen know that properly designed bridges, as well as steel hopper cars, may be loaded considerably beyond their nominal capacity, and that they will carry a definite amount of overload regularly and continuously without requiring any closer attention than usually bestowed under ordinary good maintenance conditions. This capacity for overload provides to a large extent for future increases and developments.

We know from numerous tests and long experience that bridges properly designed and constructed of proper material and with members proportioned in accordance with specifications equally as good as the standard adopted by the American Railway Engineering Association, so long as maintained in good condition, will safely withstand an overload of 50 per cent. without any traffic or speed restrictions; that such a bridge may be subjected to an occasional overload considerably in excess of 50 per cent., without speed restrictions; and if the



speed is regulated, the bridge will stand an occasional overload of 100 per cent. Therefore, it should be clearly understood by the operating officials of railways that a bridge of the nominal E-50 capacity, that is, one designed for Cooper's E-50 loading in accordance with the American Railway Engineering Association's standard specifications, will not reach its full regular traffic capacity until the different classes of engines now in service shall have about the weights given in table 4, and an E-60 bridge not until these engines have increased to the extent shown in table 5.

An examination of these tables will show that the regular service capacity of an E-50 or an E-60 bridge will take care of engines having an increased weight over those now in service to the following extent:

Types.	E-50.	E-60.
16 and 24-wheel articulated.	12 per cent.	34 per cent.
10-coupled .....	19 per cent.	43 per cent.
Mikado, 12 and 20-wheel articulated, Atlantic, Consolidation, 12-wheel type.	30 per cent.	56 per cent.
Pacific and decapod.....	39 per cent.	67 per cent.
Prairie .....	45 per cent.	75 per cent.
Electric .....	53 to 61 per cent.	84 to 94 per cent.

The capacity of these classes of bridges when subjected to occasional loads or to regular loads operated under restricted speed will be considerably in excess of that indicated above. For an example, an E-50 bridge with an overload of 75 per cent. which, when the bridge is in good condition and up to the American Railway Engineering Association Standard in design, is perfectly safe for occasional loads or regular loads under restricted speed, will carry engines weighing in excess of the engines now in use to about the extent indicated below:

16 and 24-wheel articulated engines.....	30 per cent.
10-coupled .....	39 per cent.
Mikado, 12 and 20-wheel articulated, Atlantic, Consolidation and 12-wheel type engines....	52 per cent.
Pacific and decapod.....	62 per cent.
Prairie .....	70 per cent.
Electric .....	79 to 88 per cent.

It will be seen from the above that loads which strain an E-60 bridge to its *regular service capacity* can be operated *occasionally* over an E-50 bridge, and *even regularly* when *speed is restricted*.

#### HAVE PRESENT BRIDGES SUFFICIENT STRENGTH?

In view of past experience, it is perhaps reasonable to assume that some of the heavy types indicated in table 4 as developing the full regular service capacity of an E-50 bridge may probably be operated regularly over heavy grade divisions, but experience with the present heaviest locomotives does not indi-

TABLE 4.—FULL REGULAR SERVICE TRAFFIC CAPACITY FOR E-50 BRIDGES BASED ON AN OVERLOAD OF 50 PER CENT.

Locomotives.	Weight.	Wheel Base.	Average Axle Load.	Percentage of Increase.†
Cooper's E-75 .....	337,500	23.00	75,000	50.0
*Atlantic .....	280,000	30.79	82,400	31.0
Prairie .....	356,300	34.25	82,600	46.0
Consolidation .....	342,300	26.50	75,600	32.0
12-wheel .....	344,800	27.08	73,000	32.0
Decapod .....	374,300	29.83	66,400	40.0
Pacific .....	375,000	35.20	81,700	39.0
Mikado .....	394,200	35.00	77,900	29.0
12-wheel articulated....	436,200	30.66	72,600	30.0
10-coupled .....	429,800	43.50	71,700	19.0
20-wheel articulated....	629,000	59.80	70,800	32.0
16-wheel articulated....	552,000	40.17	62,800	12.0
24-wheel articulated....	695,000	65.92	62,000	13.0
12-wheel electric.....	460,000	38.50	78,800	53.0
16-wheel electric.....	516,000	44.22	64,500	61.0

\*The Atlantic type applies to spans under 15 ft.; for greater spans the weight of this class of engine would run over 60 per cent. in excess of the heaviest type now in service.

†Percentages of increase in column 5 represent the approximate increase in weight of locomotives and driving loads in excess of the maximum weights now in actual use.

cate that still heavier types will be proper and economical on low-grade divisions. But suppose they should be operated regularly on all divisions, whether high or low grade, then an E-50 American Railway Engineering Association specification bridge will have ample capacity to take care of them.

It is less reasonable to assume that the still heavier types of table 5 required for developing the full regular service capacity of an E-60 bridge will ever be operated even on high-grade divisions, unless gage of track is increased and greater clear-

ances made, both laterally and vertically, in tunnels and bridges, and the right-of-way probably also increased, or, in other words, unless all present standards are abandoned and the railway practically reconstructed.

TABLE 5.—FULL REGULAR SERVICE TRAFFIC CAPACITY FOR E-60 BRIDGES BASED ON AN OVERLOAD OF 50 PER CENT.

Locomotives.	Weight.	Wheel Base.	Average Axle Load.	Percentage of Increase.†
Cooper's E-90 .....	405,000	23.00	90,000	50.0
*Atlantic .....	336,000	30.79	98,800	57.0
Prairie .....	427,600	34.25	99,100	75.0
Consolidation .....	411,000	26.50	90,700	58.0
12-wheel .....	413,500	27.08	87,600	58.0
Decapod .....	449,400	29.83	79,500	68.0
Pacific .....	450,000	35.20	98,000	67.0
Mikado .....	473,000	35.00	93,500	55.0
12-wheel articulated....	523,800	30.66	87,100	56.0
10-coupled .....	515,800	43.50	86,000	43.0
20-wheel articulated....	754,800	59.80	85,000	58.0
16-wheel articulated....	662,500	40.17	75,400	34.0
24-wheel articulated....	834,000	65.92	74,400	35.0
12-wheel electric.....	552,000	38.50	94,600	84.0
16-wheel electric.....	619,200	44.22	77,400	94.0

\*The Atlantic type applies to spans under 15 ft.; for greater spans the weight of this class of engine would run over 90 per cent. in excess of the heaviest type now in service.

†Percentages of increase in column 5 represent the approximate increase in weight of locomotives and driving-axle loads in excess of the maximum weights now in actual use.

But suppose such types can be constructed and placed in operation without changing standard gage and clearances, they surely would not be operated regularly on low-grade divisions, and if their regular operations should be confined to high-grade divisions, then E-50 bridges on low-grade territory would have ample capacity to enable these types being transferred to and from these high-grade territories.

It appears, therefore, that an E-50 bridge is a good and economical type and provides for increased loading above the heaviest now in service to a sufficient extent to justify the railways which consider it a proper standard on all divisions until such time as conditions require practically a complete reconstruction of the railway.

It is, of course, admitted that an E-60 bridge is heavier, stronger and stiffer than an E-50 bridge. It will stand more abuse and more neglect, but it will cost from 12 per cent. to 15 per cent. more for its construction. While a number of roads have adopted this class of bridge for all divisions and others are contemplating its adoption, the justification therefor is not apparent in many cases. The mere fact that one or two roads started a somewhat radical change by building E-60 bridges should not in itself be sufficient excuse for other roads to do likewise. This tendency toward the adoption of E-60 loading is perhaps influenced more by precedent than by good, sound reason and judgment, and is being stimulated by the bridge companies, who profit by a greater tonnage of metal used in construction.

The writer hopes it will not be inferred that he condemns E-60 bridges as unreasonably heavy and extravagant and, therefore, not consistent with economical construction. They are better bridges than the E-50 class, and those who are in a position to justify them in paying more for the stronger structure, or who honestly believe this reserve strength will be required in the future, should not be classed with the extravagant, since at the most it is a case of foresight and judgment.

While E-60 bridges are stronger than those of E-50 class, it is probable that if the weights of engines ever increase to an extent sufficient to develop their capacity, many of these bridges, as now being constructed, will not have sufficient clearance to enable such excessively large locomotives to be safely operated. If, therefore, E-60 bridges are constructed, it would be well to provide a lateral clearance of at least 8 ft. from the center of track and an overhead clearance of not less than 25 ft. above top of rail, in which case there will be some possibility of operating over them the excessively large locomotives required to develop their strength.

Those roads which prefer stronger bridges on account of severe and heavy service on high grades could reasonably adopt the E-60 as standard for high-grade divisions and E-50 for low-grade divisions.





### TRANSITION CURVE USED ON THE LAKE SHORE.

While there are many forms of spiral or transition curves in use today which differ radically in their methods of mathematical deduction, the resulting curves in general approximate very closely to each other. In practice the principal points of superiority of certain curves over others lie mainly in the readiness with which they are understood and applied in the field. To meet with general use among field engineers, many of whom are not technical men, the transition curve must be easily understood and the offset or deflection values must be readily secured, either by simple computations or directly from tables.

As an example of a simple transition curve capable of quick use in the field, that used by the Lake Shore & Michigan Southern is here given, together with a description of the method followed in working out the two problems most commonly en-

posite the beginning or end of the curve at the same interval on the main tangent. Then the offsets ( $O'$ ) corresponding to those distances ( $M$ ) taken from the tables and multiplied by the degrees of the circular curve will give measurements from these points ( $M$ ) previously set on the circular curve and on the tangent to corresponding points on the transition curve at which stakes are driven to define the points on the transition curve.

To fit the transition curve to the point of change of degree of curvature in a compound curve, determine the point of compound curve (P. C. C.) and fit the curves both ways from it so that at this point of compound curve they will lap past at a distance apart equal to the offset ( $O$ ), the total offset at this point corresponding to the length of transition curve ( $2N$ ), which it is desired to use. This offset is obtained from the table by assuming the half length of transition curve ( $N$ ) and by a knowledge of the difference of degree of curvature of the two

### TABLE OF OFFSETS AND EXPLANATION

$O$  = Total Offset  
 $D$  = Degree of Circular Curve  
 $O = \frac{3820 \sin^2 \frac{1}{2} A}{D} = \frac{N^2}{6R}$   
 $O = \frac{M^3}{N^3} \frac{O}{2}$   
 $N = \frac{1}{2}$  Length of Transition Curve =  $\frac{A}{D}$   
 $O'$  = Offset at any point " $M$ " from either end of Transition Curve.  
 $A$  = Angle thrown out from Circular Curve = Angle of Transition Curve.

N	O	Offsets $O'$ for successive values of M M = Distance from end of Curve											
		25	50	75	100	125	150	175	200	225	250	275	300
50	0.073	0.005	0.036										
100	0.291	0.002	0.018	0.061	0.145								
150	0.654	0.002	0.012	0.041	0.097	0.189	0.327						
200	1.164	0.001	0.009	0.031	0.073	0.142	0.246	0.390	0.582				
250	1.818	0.001	0.007	0.025	0.058	0.114	0.196	0.312	0.465	0.663	0.909		
300	2.618	0.001	0.006	0.020	0.048	0.095	0.164	0.260	0.388	0.552	0.758	1.008	1.309

Above Table gives offsets for connecting a One Degree Curve with a Tangent by adding 50', 100', 150', 200', 250', 300' to each end of the Curve. Offsets are given for each 25' (Measured along Curve) from either end of Transition Curve to its middle point.

Offsets for any Curve other than one Degree are found by multiplying offsets given by the Degree of Curve.

To lay out a Transition Curve, measure from Vertex along the Tangent a distance  $T' = T + O \tan \frac{1}{2} I$ . At this point make an offset " $O$ " obtained from the second column in above table corresponding to the desired value of " $N$ " (increased length of curve as shown in first column of Table) to the B.C. of circular curve. Locate the E.C. of circular curve in the same manner and run in the curve from B.C. to E.C.

The middle point of this offset will be the middle point of the Transition Curve. Measure from this middle point a distance  $N$  as above, to the point B.T.C. on the Tangent and to the point E.T.C. on the circular curve.

From the two ends of the Transition Curve thus established lay off intermediate points on the transition curve by offsets from the Tangent and circular curve respectively as found from the Table for given distances " $M$ " from these ends of the curve.

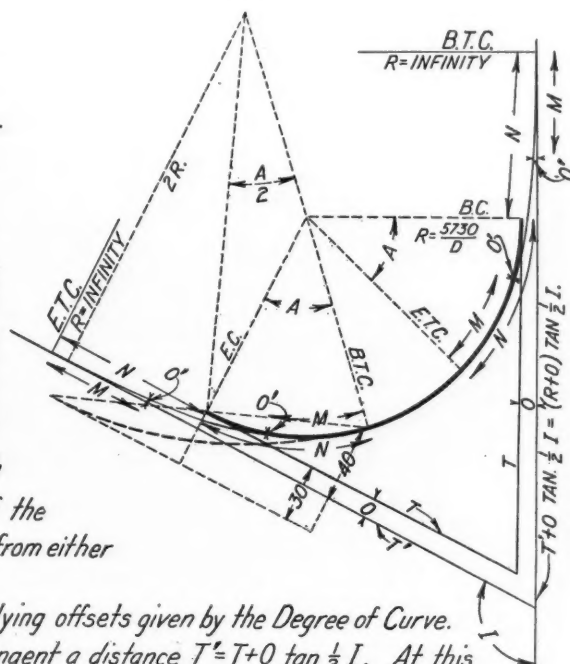
Transition Curve Table.

countered, in fitting a transition curve to the end of an existing curve and placing such a curve at the point of change of degree of a compound curve.

In fitting a transition curve to the end of an existing curve, the end of the circular curve approaching the main tangent is fixed so that it will become tangent at the beginning of the curve (B. C.) or the end of the curve (E. C.) to  $T'$ , a line parallel to the main tangent and at a distance inside of it equal to the offset ( $O$ ), the total offset at the beginning or end of a curve corresponding to the length of the transition curve ( $2N$ ) which it is desired to use. This offset is obtained from the table by assuming the half length of spiral ( $N$ ) and by knowing the degree of curvature of the circular curve to be fitted. With the transit at the beginning or end of the curve, points are set on the circular curve at intervals of 25 ft. from the instrument to the end of the spiral, and from a point on the main tangent op-

posite the beginning or end of the curve at the same interval on the main tangent. Then the offsets ( $O'$ ) corresponding to those distances ( $M$ ) taken from the tables and multiplied by the difference between the degrees of curvature of the two circular curves, give measurements from the points ( $M$ ) to the corresponding points on the transition curve at which stakes should be set to define its position.

The Burlington is placing 9 ft. ties under the joints on a short stretch of main track near Downers Grove, Ill., for experimental purposes. The rail is laid with staggered joints and on 8 ft. ties otherwise, the additional length of the tie being laid on the joint side to give the increased bearing at the joint.



# REPLACEMENT OF THE RACCOON MOUNTAIN TUNNEL ON THE NASHVILLE, CHATTANOOGA & ST. LOUIS.

In connection with the construction of second track which the Nashville, Chattanooga & St. Louis is now carrying on from Chattanooga, Tenn., to Shellmound, a short tunnel is being replaced by an open cut. This line passes through some very rough country a short distance out of Chattanooga, and is built largely on side hills, although at this point it passes over a saddle. The line was originally built in 1852 with an open cut across this divide, but was in operation only a short time until a succession of slides came in. Track was laid over these slides and traffic maintained, while the work of removing the material was prosecuted vigorously. These slides were moved in benches, as many as three tracks being in the cut at one time in several instances. Very little progress was made in this way, as new slides kept coming into the cut as fast as the other material was removed, and an investigation of the hill side showed that the earth was broken into a series of ridges or benches for a distance of 1,000 ft. up the slope. A

over 120,000 yds. were taken out before the cut was completed.

This work is being done under the direction of Hunter Macdonald, chief engineer; C. H. Johnson, engineer of construction; and R. A. Milan, resident engineer, to whom we are indebted for the opportunity to secure the above information.

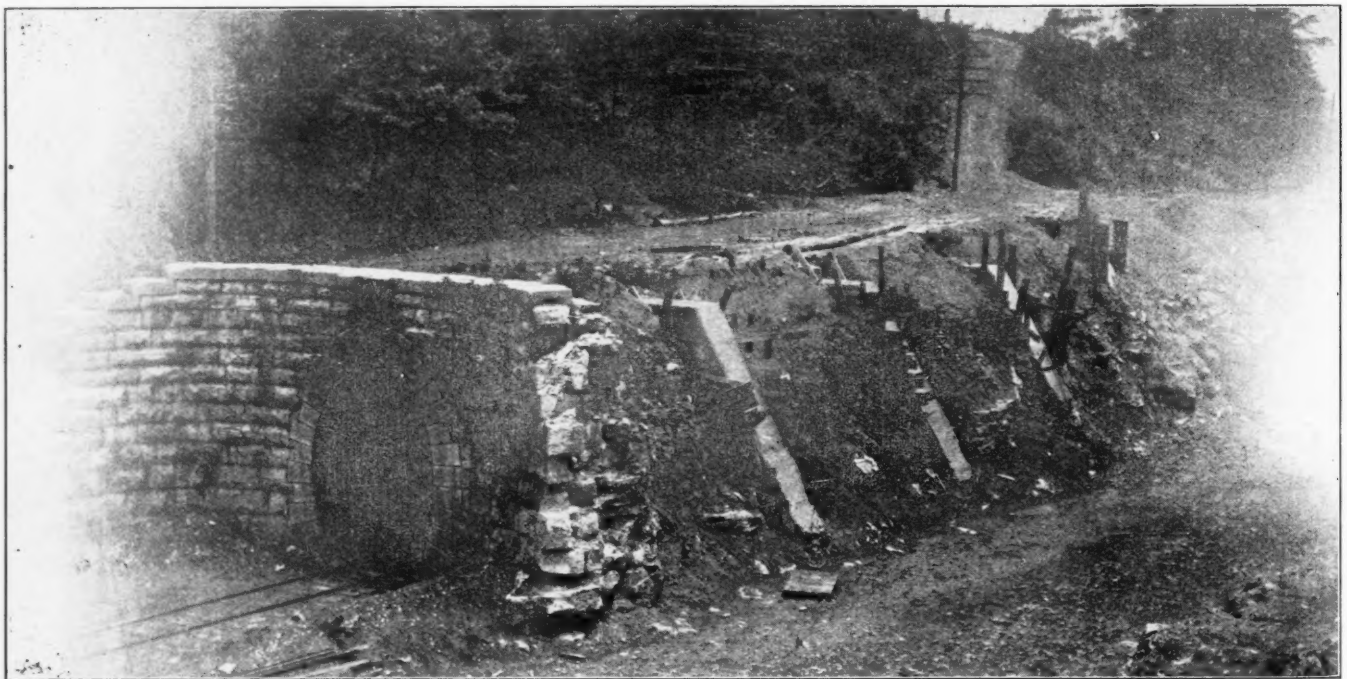
## COMMITTEES OF THE ROADMASTER'S ASSOCIATION.

The following men have been appointed members of the different committees of the Roadmasters' and Maintenance of Way Association for the ensuing year:

*Foreign Labor.*—Coleman King (N. Y. C. & H. R.); P. J. McAndrews (C. & N. W.); Geo. M. Greene (C. R. I. & P.); J. W. Fletcher, Jr. (Car. & N. W.); C. C. Johnston (L. & N. W.); A. B. Richards (L. E. & W.); B. A. West (A. T. & S. F.).

*Stone Ballast from the Crusher to the Track.*—Fred B. Adams (P. & R.); John D. Boland (U. P.); A. M. Clough (N. Y. C. & H. R.); Henry Kleine (C. & A.); D. Foley (M. C.); Wm. A. Brandt (C. & N. W.); Michael Deltgen (C. & N. W.).

*How to Secure Foremen—Organization of Section—Length of Section.*—P. M. Dinan (L. V.); L. A. Lewis (P. & R.); J. A.



Raccoon Mountain Tunnel, Showing Buttress Walls.

dry wall was then built on each side of the cut, and, although this wall held, the slide over-topped it and covered the track 10 ft. deep without injuring the wall in any way. Following this experience a tunnel was built between these walls in 1858 and filled over with earth so that the slides could pass over it. After this tunnel was constructed very little further sliding occurred, and a highway has since been built over the top of the tunnel, as shown in the photograph.

When the present work was started it was decided to excavate for two tracks at one side of the tunnel, leaving the tunnel and the track through it undisturbed for emergency use. In addition to eliminating the tunnel, this work improves the alinement at the south end of the tunnel. In connection with the excavation, buttress walls were constructed along the open cut side of the tunnel at intervals of 28 ft. to oppose the thrust from the slope on the other side. An investigation showed that the old dry walls rested on solid rock, so the foundation for the buttresses were placed on these walls. No slides have occurred since the new cut was excavated, except a small one at the west end, which was stopped by a row of piles, and no further trouble is anticipated. The original estimate of the material to be removed, based on a  $1\frac{1}{2}$  to 1 slope, was 83,000 yds., and

Roland (C. & N. W.); John Barth (C. C. C. & St. L.); Carl Buhrer (L. S. & M. S.); J. P. Corcoran (C. & A.); T. F. Donahoe (B. & O.); J. E. Wilkinson (C. & N. W.); Bruce James (C. & E. I.).

*Under What Department Should Construction Work Be Handled to Obtain Best and Most Economical Results?*—M. Burke (C. M. & St. P.); T. H. Hickey (M. C.); James Sweeney (C. & E. I.); Thomas Thompson (A. T. & S. F.); A. E. Muchotte (C. R. I. & P.); M. Donahoe (C. & A.); Geo. Barnoske (C. M. & St. P.).

*New and Improved Appliances.*—W. E. Emery (P. & P. U.); J. E. McNeil (A. T. & S. F.); James Burke (Erie); J. S. McGuigan (St. L. S. W.); A. G. Hart (S. P.); W. R. Thompson (Cent. of Ga.); Wm. Shea (C. M. & St. P.).

*Arrangements.*—Geo. D. Gifford (N. Y. C. & H. R.); T. H. Hickey (M. C.); Abel Grills (G. T.); L. W. Hanselman (N. Y. C. & H. R.).

In addition, a paper on deterioration of spikes and angle bars in preserved ties will be presented by W. M. Camp, and there will be a general discussion of the topics, Tie Plates vs. Guard Rail Praces for Holding Track to Gage, and The Best Method of Inspecting Ties in Track for the Following Year.



## General News Section.

Employees of the Lake Erie & Western have been forbidden all intoxicating liquors, whether on or off duty.

The Santa Fe Railway has reduced the working time at its San Bernardino, Cal., shops to 45 hours a week. This is 15 hours less than the schedule of a month ago. The present reduction, it is said, will be the last.

A number of rumors have been in circulation recently to the effect that W. S. Tinsman will retire as general manager of the First district of the Rock Island and that, in consequence, various changes in the official personnel of that road will be made. These reports are officially denied and it is stated that there is no foundation for them.

Telegraph operators, towermen and agents on the New York Central have been granted an increase in wages of from 10 to 15 per cent. The Southern Railway has increased the pay of several hundred clerks. The increases range from 5 per cent. for employees who have been in the service but a short time, to 15 per cent. to those who have seen five years or more service. The same company's telegraph operators will be granted an average increase of about 15 per cent.

The New York Public Service Commission, First district, has made application to the state controller for an appropriation of \$1,000,000 as the state quota of the expense of grade crossing elimination in New York City for the ensuing year. In 1909 and 1910 the commission requested appropriations of \$600,000 for each year, and in both cases the legislature appropriated only \$250,000. There are more than 400 grade crossings in the limits of the city of New York, and while the commission has already ordered elimination work which will cost more than \$2,000,000, there is still a large amount to be done. The law provides that the state pays one-quarter, the city one-quarter, and the railway one-half.

The Lake Shore & Michigan Southern has in experimental use between Toledo and Cleveland two sets of the Morkrum rapid printing telegraph, the two being worked duplex on a single grounded wire. In outward appearance these instruments are somewhat similar to other rapid printing systems heretofore in use, the sending apparatus having the appearance of a typewriter. The distance between Toledo and Cleveland is 113 miles. The Morkrum apparatus has been successfully used for several months on telegraph circuits over 200 miles long, where messages have been sent all day at the rate of more than 100 an hour. The Lake Shore contemplates introducing the apparatus on a number of circuits.

The Pennsylvania Railroad has received a simple superheater Mallet locomotive from the American Locomotive Company, which is being broken in and will be thoroughly tested. The design is an attempt to get the most powerful locomotive possible, consistent with the rather narrow over-all cross-section, which has made necessary the use of simple cylinders. An interesting feature, which will develop in time, will be to see how the simple type Mallet with a superheater will compare with the compound type with and without a superheater. The engine has 27 in. x 28 in. cylinders, 56 in. drivers, and carries a boiler pressure of 160 lbs. It has a tractive effort of 93,000 lbs., and a total weight of 483,000 lbs. Of this 23,500 lbs. is on the leading truck, 435,500 lbs. on the drivers and 24,000 lbs. on the trailing truck. The tender weighs 186,400 lbs.

As announced in our Elections and Appointments columns, Oliver Rowe, inspector of transportation, Union Pacific and Southern Pacific, died at Cheyenne, Wyo., November 14, from effects of burns received in a butting collision between a passenger train and a freight on the Union Pacific at Rock River, Wyo., on October 28. The freight train, after setting out cars at Rock River, had backed on the passing track, which is situated between the eastbound and the westbound main tracks. The passenger train was approaching Rock River well under way, with automatic block signals in the proceed position. The brakeman of the freight train became confused as to the switches, and instead of closing the passing track switch leading from the westbound main, he opened the passing track switch leading to

the eastbound main, directly in front of the passenger train and too late to avoid a collision. The engineman and the fireman of the passenger train and one passenger were killed, others being more or less seriously injured, and 40 being slightly hurt.

### Illinois Central's Attitude Toward Striking Employees.

T. J. Foley, assistant general manager of the Illinois Central, in a letter referring to the strike situation on that road, states that it is the definite policy of the road not to recognize any federation such as proposed by the leaders of the present strike, and that it is not opposed to unionism, but that employees will be permitted a voice as to those things that directly affect working conditions. Continuing he says:

"Realizing that the strike inflicted upon this company September 30 was as much an injustice to the great majority of our employees as to the company, in that their leaders compelled an illegal and unjustifiable compliance with such order, for the reason that the federation created an uncontrollable condition of those who were disposed to be conservative and played into the hands of those who desired the strike for ulterior and questionable purposes; we are willing to take back those who have not been implicated in acts of violence against the company or its employees, so far as there may be vacancies. It is not the intention to change the rates of pay, and the men now in our service, or who may hereafter be employed, will be treated with the absolute fairness that has characterized the management of this company heretofore in dealing with its employees. None will be displaced so long as they desire to remain in our service, except for good cause, and all will be protected in their rights indefinitely to the utmost extent of our ability, which has been pretty clearly demonstrated as amply sufficient.

"We feel that we have an asset in our old employees who have that feeling of loyalty essential in the conduct of any business. We shall give those who return the greatest consideration. They will not be discriminated against.

"In all sincerity, we desire to add that the bulletins put out by many of the strike leaders as to the conditions are false and intended to mislead. The business of this company is being conducted in a satisfactory manner. There are plenty of honorable mechanics and laborers who have had a sufficiency of misleading and labor turmoil who are now looking out for their personal welfare and that of their families. Many of them have had similar experience elsewhere and are profiting thereby in endeavoring to once more locate themselves permanently in a position that will assure them a competence. These men are very carefully selected and are being employed at the rate of about 100 per day; consequently, we cannot hold out any inducement to former employees over any extended period."

### Safety Committees on the Baltimore & Ohio.

With a view to promoting safety of travel and protecting its employees from personal injury in the discharge of duty, the Baltimore & Ohio Railroad has appointed a safety committee. The committee, which began work November 1 with General Manager Thompson as chairman, is composed of general officers of the road, including A. Hunter Boyd, Jr., assistant general attorney; J. W. Coon, assistant to general manager; Earl Stimson, chief engineer maintenance of way; C. W. Egan, general claim agent; Dr. S. B. Bond, chief medical examiner; and W. L. Robinson, shop expert of the mechanical department. Divisional safety committees have also been appointed as auxiliaries, headed by division superintendents as chairmen and composed of division officials, including trainmaster, division engineer, division claim agent, agents of important freight terminals, medical examiner, secretaries of the Young Men's Christian Association, an employee from each shop to represent shopmen, engineman to represent enginemen, conductor to represent trainmen, and yardmaster to represent yard employees.

The central committee will meet on the first of each month, while the divisional committees will convene the middle of the month. The divisional committees are to lay before the central committee such matters as will tend to bring about improvements

in the safety and efficiency of operation and protection to employees and the public.

The chairmanship of the auxiliary committees is vested in the superintendents for a period of six months, the plan providing for a progression to the office so that each member may serve as chairman. This same organization is carried out in the committee of general officers, with the exception of the vice-chairmanship, which is permanent.

Employees while serving on the safety committee of making investigations are exempt from other duty so that their time may be devoted to a study of the work of the committees. While so engaged the men are allowed full pay and expenses.

General Manager Thompson, in issuing the circular outlining the work of the safety committee, says: "We desire each of our employees to act as a Committee of One to see that everything possible is done to prevent accidents, and the suggestions of the men should be solicited through the divisional committeemen. It is my personal desire that all the division officers shall take an interest in this question of safety. Any suggestion that may occur to any employee which he feels will advance this work will be carefully considered."

#### Saving the Pennies.

The efforts that railway managers are making to stop waste in small things as well as in great ones are illustrated by a circular entitled "Office Economics," which S. M. Felton, president of the Chicago Great Western, has sent to all office employees of this road. The circular, which has for a sub-title, "How You Can Help Save the Pennies," is as follows:

Appeal having been made to employees in all other branches of the service for co-operation in the effort to reduce expenses, we reach one where the easiest and at the same time some of the greatest economies can be practiced. It has been demonstrated that by exercising judgment and care in the ordering and use of office stationery and supplies you can accomplish much toward the desired end. The items where savings can be effected may seem insignificant in themselves, but when considered in the aggregate they represent an annual amount equal to more than your month's salary.

A few suggestions along these lines are:

**Letterheads.**—In addressing letters to the various departments of the road if plain paper is used instead of printed letterheads a large reduction in printing bills will result.

Where a letter is spoiled before being completed, if the sheet of paper is laid aside and used as scratch paper instead of being thrown in the waste basket, the full value of using it will be obtained and less scratch paper will have to be ordered from the stationer.

**Carbon Paper.**—Experiments show that from one sheet of carbon paper one hundred legible copies can be made. Carbon paper deteriorates with exposure and the least possible number of sheets should be ordered at one time. Use each sheet until an equivalent of one hundred copies is made and you will obtain its maximum degree of service.

**Rubber Bands and Erasers.**—The price of rubber is continually increasing, and these articles represent the most expensive of office supplies. Do not waste rubber bands. An eraser fastened to your typewriter or desk by a card (or rubber band to give elasticity) will not only be found to be a timesaver, but will prevent the possible actual loss of the eraser.

**Envelopes.**—Where more than one letter is sent to the same person each day an envelope should be addressed and left open until mailing time, so as to avoid using several envelopes for taking care of mail that could be enclosed in one. Large envelopes cost more than small; and where a small envelope will answer it should be used, even though it is not on your desk. It will not take a minute's time to get one from your stationery supply. Always use manilla envelopes for company correspondence.

**Postage Stamps.**—Keep them under lock and key and use them only where the railway man will not serve the purpose. Stamps are the same as money and should be used sparingly.

**Pencils.**—Use one pencil at a time. It is not necessary for stenographers to keep four or five pencils sharpened at once.

**Empty Ink Bottles** have a value. Return them to the stationer.

**Telegraph Service.**—There is a general idea that Western Union and Postal service costs the company nothing. This is

not true. While we are allowed a certain number of free messages, all above that are charged for at regular rates, and each year we are compelled to pay a considerable sum for excess telegraphing. Therefore, all messages sent via commercial lines should be carefully censored in order to reduce the number of words to a minimum. Messages sent over our own wires should be brief. Mail service should be used in preference to telegraph whenever possible to do so without detriment to the company's interest.

**Wrapping Paper and Cord** should not be wasted. Frequently they can be used a second or third time. By saving paper and cord from packages received in your office your requisitions for these articles will be very few.

**Gas and Electric Light.**—In these items a very large saving can be made. It is not necessary to turn on all lights at once; use only what are required, and turn them off when leaving the office or when you can see just as well without their use.

**Drinking Water.**—This is not furnished free of cost, as is generally supposed. It is aimed to supply the offices with the purest and freshest of water. When it is considered that several hundred gallons are used each month for drinking purposes, it can readily be seen that the cost is large. Draw only enough water at a time that will be consumed and avoid throwing any on the floor or in the waste bucket.

**Towel Service.**—This is likewise an expensive item, and by being economical in the use of towels a considerable saving can be made.

Watch the little things—the big ones will take care of themselves. One hundred pennies make one dollar, and dollars saved are dollars earned. There are many ways in which you can earn your salary; let the economical use of the articles enumerated above be one of them.

#### The University of Illinois and the Railways.

Dean Goss, of the Engineering College of the University of Illinois, addressed the St. Louis Railway Club on the above subject on November 10. The work of the University of Illinois along railway lines frequently has been mentioned in these columns. Dean Goss referred to some matters which are new to most readers:

The school of railway engineering and administration is developing on its engineering side many interesting problems. For example, a knowledge of the forces which must be applied to maintain the motion of railway trains is a matter of fundamental importance in many of the problems of the railway. The University of Illinois was almost a pioneer in this field of research. In conjunction with the Illinois Central and the Cleveland, Cincinnati, Chicago & St. Louis, it designed and constructed a series of dynamometer cars, each new design overcoming defects which had appeared in its predecessor. The third car of the series has now been in successful operation for the past three years and it has served in the development of the most accurate array of data concerning train resistance which has thus far been published.

Professor Schmidt found in his experiments that the resistance of trains expressed in pounds per ton varied not only with the train speed but also with the weight of the individual cars of which the train was composed. At like speeds the resistance of a train composed of cars weighing 75 tons each was made less than the resistance of trains weighing 20 tons each. These experiments likewise demonstrated that atmospheric temperature also has an important influence on train resistance. His results have, therefore, been corrected for the influence of atmospheric temperature, and they are presented in such form as to make clear the influence of car weight. The discrepancies existing among the results of previous experiments are largely due to the neglect of the influence of car weight and atmospheric temperature. He has found, for example, that at 30 miles per hour the resistance is 4½ lbs. per ton for trains composed of cars weighing 20 tons each; the resistance is 10 lbs. per ton at this same speed. (See Bulletin No. 43 of the Illinois Engineering Experiment Station.) He is now in the process of determining the precise effect on train resistance of changes in atmospheric temperature below 30 deg. F. and also the effect of different degrees of curves in the track. This accomplished, he will have completely solved the train resistance problem in its application to modern American freight-car equipment, and his work will be



permanent so long as the present type of freight-car equipment continues to exist.

Another important line of investigation has led to the development of a system, not entirely original, for detecting defects in track bonds on electric lines. An electric test car has been equipped with apparatus designed to record automatically the conditions of every bond it passes over. The record gives the electrical resistance of the joint, in comparison with the resistance of a short length of solid rail. The results are registered on a web of paper which unrolls as the car proceeds, a half-inch length of paper corresponding to a rail length. In action the car is allowed to proceed at a moderate speed, the record for each joint being made automatically as it is passed, while an attendant operating a push-button controls a supplemental record representing the location of the numbered line poles as they are passed. An examination of the record enables one at once to pick out and locate the imperfect bonds. The test car has the form of an interurban car, the interior being fitted up with the instruments necessary to make it a laboratory. It is designed for the instruction of students and for the solution of problems of interest to the electric traction interests. In the near future Professor Schmidt hopes to continue with this car work already well advanced for the purpose of determining the tractive power necessary to handling such cars on track having different degrees of curvature.

The university is giving generous attention to problems underlying the design of railway equipment.

A standard Master Car Builders' drop testing machine has been installed, which is designed especially for use in testing couplers, coupler knuckles and draft gears, but is available for use in testing materials of many different sorts. The machine consists of a hammer weighing 1,640 lbs., sliding in two upright guides 50 ft. in height, between which it is allowed to fall upon the test specimen supported by a massive anvil resting upon a foundation through the medium of heavy springs. By the use of this machine students are instructed in the process of making the proof tests of the Master Car Builders' Association and are enabled to gather impressions concerning the severe treatment which must be withstood by couplers, draft gears, bolsters, axles and other details entering into the construction of freight cars.

Another detail in car design which of late has demanded serious attention is the brake shoe. There has been installed a brake shoe testing machine possessing equivalent characteristics to those of the original Master Car Builders' machine, but one which in its details is a much more serviceable machine. It consists primarily of a shaft carrying a fly-wheel and standard car wheel, which may be either steel or cast iron. The shaft is driven at any desired speed by means of an independent engine. By reason of the presence of the fly-wheel there is available at the surface of the car wheel, when in motion, the same amount of energy as is impressed upon one wheel of a 60,000-lb. capacity car in service under like speed conditions. The shoe to be tested may be applied to the wheel with any desired pressure up to a maximum of 24,000 lbs. The tangential pull of the shoe, which develops when the shoe is thus applied to the moving wheel, is transmitted to a dynamometer, where it is recorded upon a moving paper chart. By these means the coefficient of friction of any shoe may be determined under different conditions of speed and shoe pressure. The machine likewise serves to permit the determination of shoe wear and wheel wear under any condition that may be prescribed.

The last legislature appropriated to the university \$200,000 for a building and equipment for its college of engineering. The trustees have determined that the building shall be devoted to transportation interests, and in the working out of plans it has seemed best to provide for a group of buildings. These are to consist of a main portion 65 ft. by 188 ft., having three working floors. This building is to be fireproof throughout. It will contain the offices, recitation and drawing rooms and some minor laboratories of the railway engineering department. In connection therewith there will be erected an electric test-car laboratory and a steam locomotive testing laboratory. The proposed locomotive laboratory will be housed in a building which is to be 45 ft. by 115 ft. It is to contain a wheel foundation of not less than 70 ft. in length, which is sufficient to accommodate the largest Mallet compound locomotive yet constructed, with a liberal margin for future developments. Upon this foundation are to be mounted the supporting wheels, the dynamometer and

all other accessory apparatus. The arrangement will be such that any steam locomotive may be brought to the laboratory, mounted upon these supported wheels, and operated for an indefinite period under any condition of speed and load that may be prescribed. When thus operated the performance of every part may be made the subject of careful study; that is, it will be possible to study the efficiency of the process which goes on in the firebox, the fuel consumption, the evaporative efficiency of the boiler, the draft action, the power developed in the cylinders and the thermal action which takes place there, the power developed at the draw-bar and, in fact, information which may be needed to settle any question that may arise concerning the precise performance of the particular locomotive under examination. It is not the purpose of the university to purchase a locomotive. Arrangements have been made with a great railway company which are satisfactory to the university authorities whereby a locomotive of such type as may be mutually agreed upon will be made available for the use of the laboratory for periods corresponding with the college year. Under this arrangement the laboratory will have the advantage of being able frequently to change the type and the characteristics of the locomotive to be experimented upon. A locomotive having served its purpose at the plant will go into actual service, and its place will be taken by another of a newer type. It is hoped that all of the facilities which are to be brought about through the construction of the transportation building and the locomotive laboratory will be available for service in the fall of 1912.

#### Use of Acetylene on Trains.

The following bulletin has been issued by the Special Committee on Relations of Railway Operation to Legislation:

"A bill introduced into the House of Representatives, June 15, 1911, provides as follows:

"That it shall be unlawful for any common carrier engaged in interstate commerce, by railroads to use or produce acetylene on any car of its line used in interstate transportation of passengers. Any corporation violating this provision shall be subject to a penalty of ten thousand dollars for each offense. An officer of any common carrier engaged in interstate commerce by railroad authorizing or permitting the use or production of acetylene on any car on the line of said common carrier used in interstate transportation of passengers shall be fined not more than five thousand dollars or imprisoned not more than five years, or both."

"On July 24, 1911, a circular was sent to all railways, asking for such information as was necessary to form an accurate opinion as to the extent to which existing equipment would be affected.

"It was pointed out that in construing the safety appliance act the courts have held that a locomotive handling trains in which interstate traffic is being carried is a car within the meaning of the law.

"Replies to this circular were received from 192 companies operating 224,999 miles. Of these, 125 companies, operating 94,673 miles, had no equipment of this kind; 61 companies, operating 130,326 miles, reported the following:

1. Number of locomotives equipped with acetylene headlights.	3,565
2. Number of passenger equipment cars lighted with acetylene exclusively .....	1,233
3. Number of passenger equipment cars lighted with acetylene in addition to some other form of lighting .....	896
4. Number of passenger equipment cars equipped to produce acetylene for lighting .....	1,000
5. Number of passenger equipment cars equipped with tanks for acetylene gas .....	1,625

"Of the total locomotives equipped with acetylene headlights, 3,088, or 87 per cent., are operated by twelve railways, and of the total number of passenger cars equipped to use or produce acetylene, 1,976, or 93 per cent., are operated by ten railways. All of the other railways reporting have less than 25 cars or locomotives so equipped."

#### Railway Business Association.

The speakers at the third annual dinner of the Railway Business Association, which will be held at the Waldorf-Astoria, New York, on November 22, will be Gov. Emmet O'Neal, of Alabama, and Walker D. Hines, chairman of the executive committee of the Atchison, Topeka & Santa Fe. The president, George A. Post, will preside. A feature will be the presence of numerous presidents of trade bodies in the principal cities of the country.

The general subject of discussion will be a "taking account of

stock" of regulatory laws. What is the value and efficiency of existing statutes? What is there in existing statutory machinery which in the light of experience should be discarded? What is yet needed to make regulation comprehensive?

#### FOR ADEQUATE RAILWAY EARNINGS.

It is proposed in the third annual report of the general executive committee of the association, which has been mailed to the members, that the association shall urge in nation and state a propaganda of adequate railway earnings with the makers of political party platforms. The report says in part: "Federal and State Commissioners are evidently anxious to be regarded as solicitous for the financial stability of the transportation companies. In the atmosphere thus created our work now is to encourage the development of co-operation, frank and above-board, between the rate-regulating tribunals and men of affairs in the establishment of principles and policies affecting revenues."

#### American Society of Mechanical Engineers.

The annual meeting of the American Society of Mechanical Engineers will be held in New York, December 5-8. On the first day, there will be registration in the afternoon, and the presidential address and the reception in the evening. On the morning of the second day, there will be a business session; in the afternoon, a professional session and a ladies' reception; in the evening, a lecture. On the morning of December 7 there will be a professional session; in the afternoon, an inspection of the *Olympic* and excursions; in the evening, a reunion at the Hotel Astor. On the morning of December 8 there will be a professional session; and in the afternoon, an excursion to the Brooklyn Navy Yard.

#### American Society of Civil Engineers.

At the meeting of the American Society of Civil Engineers, November 15, two papers will be presented for discussion, as follows: A Reinforced Concrete Stand-Pipe, by W. W. Clifford, Jun. Am. Soc. C. E., and Retrogression in the Tensile Strength of Cement, by J. M. O'Hara, Assoc. M. Am. Soc. C. E. These papers were printed in the *Proceedings* for September and October, respectively.

#### New York Railroad Club.

At the next regular meeting of the New York Railroad Club, to be held November 17, the paper will be on Tool Steel, by W. B. Sullivan, Philadelphia, Pa. It will be illustrated with lantern slides.

#### MEETINGS AND CONVENTIONS.

The following list gives names of secretaries, dates of next or regular meetings, and places of meeting.

AIR BRAKE ASSOCIATION.—F. M. Nellis, 53 State St., Boston, Mass.  
 AMERICAN ASSOCIATION OF DEMURRAGE OFFICERS.—A. G. Thomason, Boston, Mass.  
 AMERICAN ASSOCIATION OF GENERAL PASSENGER AND TICKET AGENTS.—W. C. Hope, New York; next convention, Seattle, Wash.  
 AMERICAN ASSOCIATION OF FREIGHT AGENTS.—R. O. Wells, East St. Louis, Ill.; annual, June 18-21, Chicago.  
 AMERICAN ASSOCIATION OF RAILROAD SUPERINTENDENTS.—O. G. Fetter, Carew building, Cincinnati, Ohio; 3d Friday of March and September; annual, March 17, Chicago.  
 AMERICAN ELECTRIC RAILWAY ASSOCIATION.—H. C. Donecker, 29 W. 39th St., New York.  
 AMERICAN RAILWAY ASSOCIATION.—W. F. Allen, 75 Church St., New York.  
 AMERICAN RAILWAY BRIDGE AND BUILDING ASSOCIATION.—C. A. Lichty, C. & N. W., Chicago. Next annual convention, third week in October, 1912, Baltimore, Md.  
 AMERICAN RAILWAY ENGINEERING ASSOCIATION.—E. H. Fritch, Monadnock Block, Chicago; annual convention, March 19-21, 1912, Chicago.  
 AMERICAN RAILWAY MASTER MECHANICS' ASSOCIATION.—J. W. Taylor, Old Colony building, Chicago. Annual convention, June 12-14, Atlantic City, N. J.  
 AMERICAN RAILWAY TOOL FOREMEN'S ASSOCIATION.—O. T. Harroun, Bloomington, Ill.  
 AMERICAN SOCIETY FOR TESTING MATERIALS.—Prof. E. Marburg, University of Pennsylvania, Philadelphia, Pa.  
 AMERICAN SOCIETY OF CIVIL ENGINEERS.—C. W. Hunt, 220 W. 57th St., New York; 1st and 3d Wed., except June and August, New York.  
 AMERICAN SOCIETY OF ENGINEERING CONTRACTORS.—J. R. Wemlinger, 13 Park Row, New York; 2d Tuesday of each month, New York.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS.—Calvin W. Rice, 29 W. 39th St., New York.  
 ASSOCIATION OF AMERICAN RAILWAY ACCOUNTING OFFICERS.—C. G. Phillips, 143 Dearborn St., Chicago; annual, June 26, 1912, Quebec, Que.  
 ASSOCIATION OF RAILWAY CLAIM AGENTS.—J. R. McSherry, C. & E. I., Chicago; annual convention, May 22, 1912, Los Angeles, Cal.  
 ASSOCIATION OF RAILWAY ELECTRICAL ENGINEERS.—Jos. A. Andreucetti, C. & N. W. Ry., Chicago.  
 ASSOCIATION OF RAILWAY TELEGRAPH SUPERINTENDENTS.—P. W. Drew, 135 Adams St., Chicago; annual, June 24, 1912, New York.  
 ASSOCIATION OF TRANSPORTATION AND CAR ACCOUNTING OFFICERS.—G. P. Conard, 75 Church St., New York; December 12-13, Louisville, Ky.  
 CANADIAN RAILWAY CLUB.—James Powell, Grand Trunk Ry., Montreal, Que.; 2d Tuesday in month, except June, July and Aug., Montreal.  
 CANADIAN SOCIETY OF CIVIL ENGINEERS.—Clement H. McLeod, 413 Dorchester St., Montreal, Que.; Thursdays, Montreal.  
 CAR FOREMEN'S ASSOCIATION OF CHICAGO.—Aaron Kline, 841 North 50th Court, Chicago; 2d Monday in month, Chicago.  
 CENTRAL RAILWAY CLUB.—H. D. Vought, 95 Liberty St., New York; 2d Thurs. in Jan. and 2d Fri. in March, May, Sept., Nov., Buffalo, N. Y.  
 CIVIL ENGINEERS' SOCIETY OF ST. PAUL.—D. F. Jurgensen, 116 Winter St., St. Paul, Minn.; 2d Monday, except June, July and Aug., St. Paul.  
 ENGINEERS' SOCIETY OF PENNSYLVANIA.—E. R. Dasher, Box 704, Harrisburg, Pa.; 1st Monday after 2d Saturday, Harrisburg, Pa.  
 ENGINEERS' SOCIETY OF WESTERN PENNSYLVANIA.—E. K. Hiles, 803 Fulton building, Pittsburgh; 1st and 3d Tuesday, Pittsburgh, Pa.  
 FREIGHT CLAIM ASSOCIATION.—Warren P. Taylor, Richmond, Va.; annual, May 15, Buffalo, N. Y.  
 GENERAL SUPERINTENDENTS' ASSOCIATION OF CHICAGO.—E. S. Koller, 226 W. Adams St., Chicago; Wed. preceding 3d Thurs., Chicago.  
 INTERNATIONAL RAILWAY CONGRESS.—Executive Committee, rue de Louvain, 11 Brussels; 1915, Berlin.  
 INTERNATIONAL RAILWAY FUEL ASSOCIATION.—D. B. Sebastian, La Salle St. Station, Chicago.  
 INTERNATIONAL RAILWAY GENERAL FOREMEN'S ASSOCIATION.—L. H. Bryan, Brown Marx building, Birmingham, Ala.  
 INTERNATIONAL RAILROAD MASTER BLACKSMITHS' ASSOCIATION.—A. L. Woodworth, Lima, Ohio.  
 IOWA RAILWAY CLUB.—W. B. Harrison, Union Station, Des Moines, Ia.; 2d Friday in month, except July and August, Des Moines.  
 MASTER BOILER MAKERS' ASSOCIATION.—Harry D. Vought, 95 Liberty St., New York; annual convention, May 14-17, Pittsburgh, Pa.  
 MASTER CAR BUILDERS' ASSOCIATION.—J. W. Taylor, Old Colony building, Chicago; annual convention, June 17-19, Atlantic City, N. J.  
 MASTER CAR AND LOCOMOTIVE PAINTERS' ASSOCIATION OF UNITED STATES AND CANADA.—A. P. Dane, B. & M., Reading, Mass.; next annual convention, second week in September, 1912.  
 NEW ENGLAND RAILROAD CLUB.—G. H. Frazier, 10 Oliver St., Boston, Mass.; 2d Tuesday in month, except June, July, Aug. and Sept., Boston.  
 NEW YORK RAILROAD CLUB.—H. D. Vought, 95 Liberty St., New York; 3d Friday in month, except June, July and August, New York.  
 NORTHERN RAILWAY CLUB.—C. L. Kennedy, C. & M. & St. P., Duluth, Minn.; 4th Saturday, Duluth.  
 OMAHA RAILWAY CLUB.—H. H. Maulick, Barker Block, Omaha, Neb.; second Wednesday.  
 RAILROAD CLUB OF KANSAS CITY.—C. Manlove, 1008 Walnut St., Kansas City, Mo.; 3d Friday in month, Kansas City.  
 RAILWAY CLUB OF PITTSBURGH.—C. W. Alleman, P. & L. E., Pittsburgh, Pa.; 4th Friday in month, except June, July and August, Pittsburgh.  
 RAILWAY INDUSTRIAL ASSOCIATION.—G. L. Stewart, St. L. S. W. Ry., St. Louis, Mo.; annual, May 12, 1912, Kansas City, Mo.  
 RAILWAY SIGNAL ASSOCIATION.—C. C. Rosenberg, Bethlehem, Pa.  
 RAILWAY STOREKEEPERS' ASSOCIATION.—J. P. Murphy, Box C, Collinwood, Ohio.  
 RICHMOND RAILROAD CLUB.—F. O. Robinson, Richmond, Va.; 2d Monday, except June, July and August.  
 ROADMASTERS' AND MAINTENANCE OF WAY ASSOCIATION.—L. C. Ryan, C. & N. W., Sterling; September, 1912, Buffalo, N. Y.  
 ST. LOUIS RAILWAY CLUB.—B. W. Frauenthal, Union Station, St. Louis, Mo.; 2d Friday in month, except June, July and Aug., St. Louis.  
 SOCIETY OF RAILWAY FINANCIAL OFFICERS.—C. Nyquist, La Salle St. Station, Chicago.  
 SOUTHERN ASSOCIATION OF CAR SERVICE OFFICERS.—E. W. Sandwich, A. & W. P. Ry., Montgomery, Ala.  
 SOUTHERN & SOUTHWESTERN RAILWAY CLUB.—A. J. Merrill, Grant bldg., Atlanta, Ga.; 3d Thurs., Jan., March, May, July, Sept., Nov., Atlanta.  
 TOLEDO TRANSPORTATION CLUB.—J. G. Macomber, Woolson Spice Co., Toledo, Ohio; 1st Saturday, Toledo.  
 TRAFFIC CLUB OF CHICAGO.—Guy S. McCabe, La Salle Hotel, Chicago; meetings monthly, Chicago.  
 TRAFFIC CLUB OF NEW YORK.—C. A. Swope, 290 Broadway, New York; last Tuesday in month, except June, July and August, New York.  
 TRAFFIC CLUB OF PITTSBURGH.—D. L. Wells, Erie, Pittsburgh, Pa.; meetings monthly, Pittsburgh.  
 TRAIN DESPATCHERS' ASSOCIATION OF AMERICA.—J. F. Mackie, 7042 Stewart Ave., Chicago; annual, June 18, 1912, Louisville, Ky.  
 TRANSPORTATION CLUB OF BUFFALO.—J. M. Sells, Buffalo; first Saturday after first Wednesday.  
 TRANSPORTATION CLUB OF DETROIT.—W. R. Hurley, L. S. & M. S., Detroit, Mich.; meetings monthly.  
 TRAVELING ENGINEERS' ASSOCIATION.—W. O. Thompson, N. Y. C. & H. R., East Buffalo, N. Y.; August, 1912.  
 WESTERN CANADA RAILWAY CLUB.—W. H. Rosevear, P. O. Box 1707, Winnipeg, Man.; 2d Monday, except June, July and August, Winnipeg.  
 WESTERN RAILWAY CLUB.—J. W. Taylor, Old Colony building, Chicago; 3d Tuesday of each month, except June, July and August.  
 WESTERN SOCIETY OF ENGINEERS.—J. H. Warder, 1735 Monadnock Block, Chicago; 1st Wednesday in month except July and August, Chicago.  
 WOOD PRESERVERS' ASSOCIATION.—F. J. Angier, B. & O., Baltimore, Md.; annual, January 16-18, Chicago.



## Traffic News.

A five-masted sailing vessel has been launched at Bordeaux, France, which is the largest sailing vessel in the world. It is 426 ft. over all.

A temporary injunction has been granted restraining the Missouri Railroad & Warehouse Commission from reducing intrastate rates on iron and steel. The injunction was granted by the federal circuit court.

The Central Passenger Association lines, following the example of those belonging to the Western Passenger Association, have decided not to make any reduced rates for the Thanksgiving, Christmas or New Year's holiday season.

While the official date of the opening of the Panama Canal has been set for January 1, 1915, it is the intention to allow vessels to use the canal just as soon as practicable. It is believed that this can be accomplished during the latter half of 1913.

A fund of \$1,325 has been raised by the North Carolina Furniture Manufacturers' Association to pay the expenses of preparing and defending a petition to the Interstate Commerce Commission for lower rates on furniture from the South to the Pacific coast.

Shippers have presented to the Winnipeg Board of Trade of Canada a petition asking for the establishment of a western branch for the Canadian Board of Railway Commissioners, claiming that at present western Canadian shippers were not getting entirely fair treatment.

A reduction of about 3 cents per 100 lbs. in the rates on potatoes from Brainerd, Minn., and other points in Crow Wing county, to the Missouri river, has been announced by the Northern Pacific to take effect December 1. The rate to Kansas City territory is reduced to 25½ cents and to Omaha territory to 24 cents.

The Lehigh Valley has established a car float service between its terminals in Jersey City and the Wallabout basin in Brooklyn. The schedule of these car floats is arranged so that freight received at the Wallabout basin in Brooklyn before 4 o'clock will be sent out the same evening on the "symbol train" (fast freight) from Jersey City.

Following the failure of Pitt Brothers & Company, of Baltimore, the Kirwan Brothers Grain Company went into bankruptcy, and certain officers of the company have been charged with obtaining money from Baltimore banks on forged bills of lading. It is said that these forged bills of lading were stamped similar to that used by the railway companies on their genuine bills of lading.

The Boston Elevated Railway has filed a petition with the Massachusetts railway commission asking for a franchise to permit it to carry freight, express matter, baggage and newspapers in Boston. It is suggested that the Boston Elevated may develop a considerable interchange of freight with the Bay State Street Railway, which controls a number of street railway lines north and south of Boston, and which has freight branches in a number of towns.

The Long Island has announced that it will take off about seven trains on its main line and a number of trains on branch lines beginning November 15. The company gives as its reason a large deficit, due to the expense of handling passenger traffic at the western end of Long Island with both steam motive power and electricity. The company estimates that this curtailment in train service will mean a saving of about \$500 a day, and about 50 men will be laid off.

The National Civic Federation has sent out to about 20,000 manufacturers, farmers, merchants, lawyers and labor leaders a list of 11 questions in regard to their attitude on the Sherman anti-trust law. Among these questions is one asking whether an interstate trade commission, with powers over corporations not unlike the powers now held by the Interstate Commerce Commission over railways, is favored. Another question is as to whether railways should be allowed to enter into agreements affecting rates subject to the approval and regulation of the

Interstate Commerce Commission. The circular also asks whether the repeal of the Sherman law is favored.

The New York, Ontario & Western has announced that on December 1 it will restore its old rates on westbound freight. These old rates were slightly lower than the rates on the Pennsylvania, the Philadelphia & Reading and other "standard" roads, and were raised to a parity with other trunk lines some time ago. It is said that both the Erie and the Delaware, Lackawanna & Western are to meet this reduction by reducing their own rates to the same extent.

At the annual meeting of the stockholders of the Pullman Company, Chicago, John S. Runnels in his presidential statement said that during the fiscal year, ended July 31, there had been an increase of 9 per cent. in the number of passengers using Pullman accommodations and an increase of 7 per cent. in the number of miles run. The total payroll of the company is \$9,663,997. The business of the company is dull at present and only 6,400 men are employed.

The Pennsylvania Railroad is to run on November 20 to 25, a farmers' special through the Delaware-Maryland-Virginia peninsula, and, on November 27 and 28, a similar train over the Pope's creek branch, in central Maryland. The peninsula farmers' special will make about 50 stops during the six day trip. Every well defined center will be visited. The Pope's creek branch train will make 12 stops in the two days. Railway officers, co-operating with the state agricultural authorities of the several states will have charge of the trains.

Negotiations have been resumed before the Interstate Commerce Commission and the Canadian railway commission looking toward the establishment of an international commission to regulate international freight and passenger rates. Judge Mabee, chairman of the Canadian commission, and Mr. Knapp, then chairman of the Interstate Commerce Commission, held conference on this question before Mr. Knapp was appointed to the Commerce Court. Canadian papers say that it is understood that Commissioner Prouty has drawn up a plan for an international commission, which is to be submitted to Prime Minister Borden.

### New Line for Guatemala Railway.

The Guatemala Railway Company will, within a few months, start construction work on a line which will run from Zacapa, Guatemala, in a southerly direction through Chiquimula, Quezaltepeque and Concepcion and through Metapan, Salvador, and Texestepeque, to Santa Ana, in all about 105 miles. Contracts will be let immediately. Most of the work will be difficult. The maximum grade will be 3 per cent., and the maximum curve will have a radius of 318 ft., compensated. There will be no trestles, but there will probably be one 500-ft tunnel. This road will carry coffee, corn, lumber, cattle, etc.

### Commissioner Prouty on the Sherman Law.

In an address before the Congregational Club of Brooklyn recently, Commissioner Prouty discussed the Sherman anti-trust law and gave his reasons for thinking that it has not been a success. These reasons may be summed up by saying that it is destructive, not constructive, and leads to endless uncertainty. He then outlined the method by which he thought the problems of trust regulation should be undertaken. He said in part as follows:

"Up to the present time the trust problem has been political, the whole subject as a practical question has never been intelligently studied, nor is there today adequate information on which to reach a conclusion. If this problem is ever to be properly dealt with it must be taken out of politics and treated in a non-partisan fashion.

"It seems to me this could best be done by creating an administrative commission, which should bear somewhat the same relation to the anti-trust act which the Interstate Commerce Commission bears to the act to regulate commerce.

"I am aware that there is a widespread prejudice against interference in business matters by government commission. It is felt that we have too much law already and that what business needs is less rather than more. No better way of exer-

cising the necessary governmental interference has been found than by an administrative commission, properly constituted.

"The first duty of this commission, and its main duty at the outset, should be to investigate and report. It should be given the fullest power to obtain information both by private and public proceedings and to make that information public. It should report to Congress the result of its investigations and its conclusions as to further legislation. I believe that a commission of broad-minded men, competent to understand and deal with the situation, would in time make plain the true nature of the question and the proper remedy; that by a gradual evolution there would come about a general understanding as to what ought to be done.

"But while the principal duty of this commission at first should be the seeking of information and the acquiring of a correct notion of the task before it, I also think that from the very first it should be invested with certain administrative duties. It should stand as the representative of the public, should receive and investigate complaints and should prosecute, through the department of justice, violations of the act.

"Provision should be made against unfair competitive methods and this commission should be charged with the duty of enforcing those provisions. It should be given authority to make within proper limits orders which would secure a compliance with the statute.

"It will finally become apparent that the supervision and regulation of big business is an administrative and not a judicial function. These trusts cannot be controlled by the courts, nor by court methods. Here, again, the history of the regulation of railways is most significant. For more than a quarter of a century the English people attempted to supervise and regulate the operations of their railways through the courts. The result was failure, and finally the attempt was abandoned and a commission was created.

"The United States had the same experience. For twenty years it was sought to administer the act to regulate commerce by judicial decree. Experience showed the futility of the attempt; it was abandoned and the commission was given administrative authority."

#### The New Haven's Industrial Bureau.

Manager W. H. Seeley, head of the industrial bureau established six months ago by the New York, New Haven & Hartford, with headquarters at Boston, has made a report covering the work of the bureau for that period. Under the title "The New England Lines' Industrial Bureau," it aims at the development of any form of industry likely to feed traffic to the New Haven system, but special attention is given to farming. It is the first railway enterprise of the kind in New England. It is under the supervision of the New York, New Haven & Hartford, the Boston & Maine and the Maine Central, being in general charge of Vice-President Campbell of the New Haven.

After referring to the fact that the enterprise is one of several for the present and future co-operative development of New England, Manager Seeley continues:

"Many lines of information are being gathered by the bureau, which deals directly with 2,500 freight and ticket agents; 1,500 or more chambers of commerce, boards of trade, business men's associations, selectmen, granges, village improvement societies and other organizations, and is in direct touch with the state departments of agriculture, and the agricultural colleges of the New England states.

"During its existence, covering a period of six months, some 900 personal calls have been made, and numerous addresses given before the boards of trade throughout the territory by the representatives of the bureau. . . . The work has covered natural resources; industrial matters of various kinds from flag stops to summer hotels, and from two-car industrial sidings to thirty miles of branch lines. More than 200 industrial sidetracks and locations, including tentative ones and those adjusted, have been handled by the bureau, averaging better than one a day. . . .

"Numerous requests have been received by the bureau for information relative to farms—a portion of which indicate that the call of the East is reaching some of the former sons of New England now located without its borders.

"The New York, New Haven & Hartford has erected a large warehouse at its Harlem river terminal for the express purpose

of providing storage and giving the New England agriculturalist an opportunity to reach New York with his apples, potatoes, vegetables, butter, cheese, poultry, dairy and other farm products.

"The New England Lines' provided space at the recent American Land and Irrigation Exposition held in New York, for a New England exhibit. The exhibit proved beyond question that it is possible to raise apples in New England equal to the best, which was further corroborated by the Maine Corn & Fruit Show recently held at Portland, Me., in which the Maine Central was interested and which was a revelation of what is produced in Maine.

"The bureau recently secured a favorable option on 36,000 acres of farm and timber land in Maine, a portion of which the Maine Central will use for an experimental farm under the supervision of the bureau, with a view to colonizing the property at a later date.

"One of the things which is receiving attention and which the bureau expects to accomplish is the establishing of several plants for the supplying of ground lime rock to the farmers at a figure that will enable them to use large quantities of it, which will prove of genuine benefit to the New England farmer.

"Arrangements have just been consummated with the *Connecticut Farmer*, of New Haven, Conn., to take over the *New England Farms*, formerly published by the Boston & Maine and the Maine Central. Many thousand copies of this paper will be distributed throughout New England."

#### Frisco-Gould Traffic Agreement.

On Wednesday it was announced that possibly the Texas & Pacific and the St. Louis, Iron Mountain & Southern would refuse to carry out the traffic agreement made with the St. Louis & San Francisco, by which the Frisco was to use the tracks of the other roads to connect its New Orleans, Texas & Mexico division with its Kansas City, Fort Scott & Memphis division. It is understood that both railway companies believed that the traffic agreement would be of value to them, but that the difficulty lay in raising funds for such improvements as were agreed on in the contract—that is, 85-lb. rail, rock ballast, sidings, stations, bridges, etc. This traffic agreement was described in the *Railway Age Gazette* of June 2, p. 1286.

#### General Review of Crop Conditions.

The United States department of agriculture gives the following general review of crop conditions: The harvests of 1911 have been practically completed and preliminary estimates made of the production of most of the important crops, from which it appears that the aggregate production of crops in 1911 is approximately 7.9 per cent. less than the crops of 1910, and about 0.4 per cent. less than the average annual production of the preceding five years.

The preliminary estimates of production in 1911, with comparisons, of such crops as have been estimated quantitatively by the bureau of statistics, with their average farm prices on November 1, 1911, and November 1, 1910, are as follows:

CROPS.	Production (000 omitted).			Price (a)	
	1911 Preliminary.	1910.	Av. 5 Yrs. 1905-1909.	Nov. 1, 1911.	Nov. 1, 1910.
Corn . . . . .bu.	2,776,301	3,125,713	2,733,751	64.7	52.6
Wheat . . . . .bu.	655,516	695,443	692,824	91.5	90.5
Oats . . . . .bu.	873,641	1,126,765	897,415	43.8	34.9
Barley . . . . .bu.	145,951	162,227	161,241	84.9	55.3
Rye . . . . .bu.	30,677	33,039	31,503	83.1	71.6
Buckwheat . . . .bu.	17,051	17,239	15,366	73.0	65.9
Flaxseed . . . . .bu.	21,692	14,116	26,313	210.6	229.4
Potatoes . . . . .bu.	281,735	338,811	304,513	76.3	55.7
Hay . . . . .tons	46,969	60,978	63,418	\$14.62	\$11.96
Tobacco . . . . .lbs.	790,663	984,349	736,201	.....	.....

(a) Cents per bushel except hay.

The production of other crops in 1911, expressed in percentage of the average production in recent years (not compared with full crop) is estimated as follows:

Apples, 126.3; pears, 110.8; watermelons, 105.1; grapes, 102.7; cantaloupes, 101.8; peanuts, 99.3; asparagus, 97.7; alfalfa, 96.1; beans, 95.1; kafir corn, 95.0; cranberries, 94.0; tomatoes, 93.9; cabbage, 93.0; raspberries, 91.0; onions, 89.7; millet, 87.2; strawberries, 83.6; blackberries, 83.5; cloverseed, 82.6; millet seed, 82.1; peaches, 80.3; hemp, 78.2; clover hay, 68.1.

Yield per acre compared with average yield, sorghum, 102.0; sweet potatoes, 101.2; hops, 90.4; broom corn, 85.1.



Condition, compared with average conditions, at or near time of gathering:

Sugar cane, 109.8; cotton, 106.9; lemons, 103.9; sugar beets, 102.6; oranges, 101.6; rice, 99.0.

This year's total crop production in each state, based upon preliminary estimates, is given below; the first figure after each state indicates its total crop production in 1911, relatively, as compared with 1910, 100 representing last year's production; the second figure indicates production in 1911, relatively, compared with the average production in years 1905-09, 100 representing the average production for the five years:

STATES.	Production 1911 compared with		STATES.	Production 1911 compared with	
	1910.	1905-09.		1910.	1905-09.
Maine .....	87	102	North Dakota .....	213	93
New Hampshire .....	86	101	South Dakota .....	56	56
Vermont .....	96	111	Nebraska .....	80	75
Massachusetts .....	85	93	Kansas .....	76	73
Rhode Island .....	89	94			
Connecticut .....	83	98	Above division....	83	83
New York .....	89	97	Kentucky .....	84	99
New Jersey .....	80	94	Tennessee .....	95	112
Pennsylvania .....	84	92	Alabama .....	111	126
Above division....	86	96	Mississippi .....	107	114
Delaware .....	88	98	Louisiana .....	106	112
Maryland .....	87	93	Texas .....	96	106
Virginia .....	83	98	Oklahoma .....	70	76
West Virginia .....	81	87	Arkansas .....	103	125
North Carolina .....	96	116	Above division....	96	107
South Carolina .....	101	121	Montana .....	149	198
Georgia .....	115	122	Wyoming .....	101	154
Florida .....	112	115	Colorado .....	88	82
Above division....	99	113	New Mexico .....	136	161
Ohio .....	92	100	Arizona .....	128	125
Indiana .....	89	99	Utah .....	94	96
Illinois .....	84	98	Nevada .....	112	206
Michigan .....	94	105	Idaho .....	124	150
Wisconsin .....	111	97	Washington .....	127	115
Above division....	91	99	Oregon .....	103	113
Minnesota .....	84	92	California .....	93	108
Iowa .....	82	91	Above division....	108	120
Missouri .....	77	90	United States .....	92.1	99.6

### INTERSTATE COMMERCE COMMISSION.

The commission has suspended further until May 14 the new regulations and rules regarding the absorption of charges at Galveston, Tex., by the Galveston, Harrisburg & San Antonio.

### Reparation Awarded.

*Whaley-Warren Lumber Co. v. Carolina, Clinchfield & Ohio.*  
Opinion by the commission:

Damages caused by defendant's failure to properly route a shipment of lumber from Dungannon, Va., to Boston, Mass.

*Carolina Portland Cement Co. v. Chesapeake & Ohio et al.*  
Opinion by the commission:

Rate of 22½ cents per 100 lbs. for transportation of cement in carloads from Fordwick, Va., to Hope Mills, N. C., found to have been unreasonable so far as it exceeded 19½ cents per 100 lbs. (21 I. C. C., 533.)

### STATE COMMISSIONS.

The Railroad Commission of Texas has granted the application of the Paris & Mount Pleasant for permission to charge 30 cents per ton on slack coal from Paris to Ragland. The special rate is made for coal for municipal consumption.

The docket of the Railroad Commission of Texas for November includes a hearing on the proposition to treat the St. Louis Southwestern and its leased line, the Stephenville, North & South Texas as one railway; and also a hearing on the proposition to cancel all special rates on crude oil and fuel oil in carloads.

The railway commission of California has begun its work of physical valuation of steam and interurban electric railways, and as a preliminary step has ordered all arilway companies to file maps and profiles of their property within 90 days. The work will be under the immediate charge of R. A. Thompson, chief engineer of the commission.

The Connecticut Utilities Commission has ordered the Connecticut Company, which is the holding company for the New York New Haven & Hartford's street railway properties in Connecticut, to produce its books to show the business done on the Hartford & Manchester trolley line in the first half of 1911. This is the first ruling of this kind made by the new commission.

The Railroad Commission of Louisiana has received a petition from the Alexandria Progressive League complaining that there is no uniformity in class rates between Alexandria and points in Louisiana on the lines of all the railways doing a business in that state, and the petition asks that the commission order the railways to put in effect the rates which are advocated by the Shreveport Chamber of Commerce except where lower rates are now in effect, which lower rates shall be continued in force. The Alexandria Progressive League thus becomes an intervener in the Shreveport Chamber of Commerce case, which has been mentioned heretofore in these columns.

Representatives of several Chicago railways recently conferred with the Illinois railway commission on the following request which was submitted by the roads: "That in cases where two or more carriers have lines between common points in this state and the line of one of such carriers is shorter than the other, then the carrier or carriers having such longer line between any two such common points may continue present rates or meet rates subsequently established by the carriers having the shorter line." The commission announced that after a petition embodying this request has been presented to it an order conforming with the request will be issued, with the proviso that the commissioners will reserve the right at any time to investigate any rate. A shipper at Waukegan, Ill., who has to pay on his merchandise 3.8 cents per 100 lbs. by rail from Chicago to Waukegan and 8 cents per 100 lbs. by boat, asked the commission to issue an order directing the boat company to reduce its rate. It was contended on behalf of the boat line that it transports merchandise more rapidly and could not afford to meet the rail rate. The case was taken under advisement.

### New York: Extending Facilities to a Competitor.

The New York Public Service Commission, Second Division (state) has decided that a charge made by the Western Union Telegraph Company to the Postal Telegraph & Cable Company for the words constituting the originating address and date on a telegram transferred by the latter to the former company is unreasonable and discriminatory. The Western Union accepts transferred messages for transmissions and delivery from the Postal to points not reached by the Postal and charges the Postal its ordinary local rate for the transmission of the message from the point of transmission to the point of destination plus an additional charge for the name of the originating point and date. The name of the originating point and date usually constitute, under the rules in force for counting, four or five words. The commission says that the Western Union, by this method of charging for the name of the originating point and the date of transferred messages, necessarily receives more for its services than it would in the case of the message originating with it at the transfer point.

It is not possible to assign any reason for this distinction except the desire of the Western Union to suppress competition at competitive points. The Postal assigns reasons why it desires to conduct its business at competitive points by the use of transferred telegrams, which are entirely satisfactory and legitimate from its point of view; it is obviously to the advantage of the Western Union, as is shown by the charge which it makes and by the notices which it sends out to prevent competition of the Postal at these points.

The commission says that clearly a public service corporation must extend precisely the same facilities to a competitor as it does to the entire world. It can make no distinction between those offering it business. It must charge them alike and serve them alike. If it is its practice to serve the immense majority of its business without a charge for the name of the originating point and the date, and it obtains its compensation for the service in fixing the rate for the words in the body of the message at such an amount as will afford it a proper remuneration for transmitting all the message contains, that rule must obtain the same with competitors as with ordinary individuals. No satisfactory reason has been offered in support of the rule.

## REVENUES AND EXPENSES OF RAILWAYS.\*

MONTH OF AUGUST, 1911. (SEE ALSO ISSUES OF OCTOBER 13 AND 20.)

Mileage operated at end of period.	Name of road.	Operating revenues				Operating expenses				Net operating revenue (or deficit).	Outside operations, net.	Taxes.	Operating income (or loss).	Increase (or decr.) last year.
		Freight.	Passenger.	Total.	inc. misc.	Way and structures.	Maintenance of equipment.	Traffic.	Trans- portation.					
291	Ann Arbor .....	\$120,855	\$68,685	\$203,033	\$17,750	\$24,037	\$5,133	\$63,231	\$7,133	\$117,284	\$85,749	\$13,986	\$74,314	\$25,970
354	Arizona Eastern .....	112,312	30,367	152,057	23,928	27,351	2,452	42,556	4,994	84,066	67,991	4,700	63,163	22,725
661	Atlanta, Birmingham & Atlantic .....	172,361	69,466	254,695	27,731	40,429	15,595	93,466	8,578	185,819	68,876	10,500	58,376	12,189
166	Atlantic & St. Lawrence .....	66,621	34,859	116,448	48,031	21,768	4,213	116,448	3,011	123,324	166,094	6,659	13,535	-26,205
166	Atlantic City .....	73,345	248,470	326,052	23,066	48,031	6,070	128,644	1,356	169,938	166,094	7,000	154,272	-6,991
21	Belt Ry. Co. of Chicago .....	43,115	23,894	67,009	23,127	13,127	832	78,139	6,115	123,339	111,588	5,500	106,088	10,212
233	Canadian Pacific Lines in Maine .....	871,304	437,582	1,402,454	233,583	204,355	40,136	30,382	3,459	80,025	80,025	7,000	73,025	7,000
1,025	Chicago & Alton .....	295,944	167,472	616,293	77,268	84,907	20,021	188,288	13,264	383,842	332,451	22,500	209,951	-18,456
476	Chicago, Indianapolis & Louisville .....	151,181	55,963	224,028	35,619	15,509	9,916	72,196	7,580	140,820	83,208	9,501	73,465	19,103
190	Chicago, Rock Island & Gulf .....	120,830	79,266	204,427	27,423	23,881	7,459	87,839	4,467	151,069	75,359	2,880	72,432	48,515
612	Detroit, Grand Haven & Milwaukee .....	187,859	101,230	296,601	49,331	29,956	12,085	103,919	9,431	204,922	99,679	18,000	84,921	-26,346
395	Georgia Southern & Atlantic .....	91,110	70,202	187,368	20,346	41,802	6,999	76,312	9,100	154,249	33,119	9,975	23,712	-9,975
347	Georgia Southern & Florida .....	345,057	224,833	608,461	104,584	89,058	20,254	212,232	15,641	441,769	166,692	31,635	135,045	82,497
351	Hocking Valley .....	567,782	100,757	713,466	86,521	96,564	7,324	191,544	14,364	396,317	317,149	42,630	274,519	-26,882
108	Indiana Harbor Belt .....	495,752	204,388	699,140	215,780	24,907	32,300	87,896	5,784	154,594	61,186	5,500	60,797	26,644
1,159	International & Great Northern .....	495,752	204,388	699,140	215,780	24,907	32,300	87,896	5,784	154,594	61,186	5,500	60,797	26,644
760	Kansas City, Mexico & Orient .....	87,501	36,340	123,841	132,009	105,864	99,181	18,579	27,443	225,54	223,991	20,000	203,081	41,274
3,769	Minneapolis, St. Paul & Sault Ste. Marie .....	1,456,483	590,902	2,168,372	243,718	276,322	46,363	627,235	42,774	1,236,412	931,960	137,341	816,564	149,322
1,345	Missouri, Kansas & Texas .....	485,169	341,991	888,145	222,771	93,459	23,008	42,038	23,526	764,802	1,601	227,341	99,242	-86,482
3,916	Missouri Pacific .....	1,543,384	467,153	2,242,637	400,227	521,944	64,210	920,389	71,513	1,978,283	264,354	80,298	183,233	-336,644
264	New Orleans, Texas & Mexico .....	69,245	21,905	98,114	21,347	16,060	5,263	44,360	7,309	61,234	3,690	1,552	2,138	-1,492
403	Northwestern Pacific .....	151,418	197,050	370,535	53,223	42,509	3,743	113,863	8,957	222,297	148,238	12,855	135,383	-166
1,014	Philadelphia & Reading .....	2,815,424	628,221	3,604,295	425,786	737,552	39,261	1,128,152	61,242	2,391,993	1,212,302	90,701	1,150,504	-119,782
240	Pittsburg, Shawmut & Northern .....	102,986	12,385	116,982	14,805	23,358	1,257	32,024	3,942	75,386	41,596	1,593	24,907	24,907
21	Port Reading .....	80,170	8,610	88,780	83,522	1	30	20,335	79	29,035	54,467	3,800	45,511	-2,924
4,731	St. Louis & San Francisco .....	2,049,848	1,069,781	3,327,791	436,726	451,718	77,037	1,220,295	88,221	2,174,017	1,98,774	156,166	1,042,608	-30,503
3,314	St. Louis, Iron Min. & Southern .....	1,780,718	554,238	2,517,734	460,242	471,157	55,122	770,613	73,654	1,830,788	686,946	81,765	603,096	32,208
3,046	Seaboard Air Line .....	1,065,291	438,036	1,677,579	255,906	286,508	52,512	586,950	48,488	1,230,346	447,215	75,000	371,764	2,009
550	Spokane & Inland Empire .....	221,826	204,960	453,065	42,873	40,922	11,909	99,663	10,082	205,450	247,615	42,200	209,571	-25,623
450	Toledo, St. Louis & Western .....	295,832	57,121	375,797	36,555	29,019	9,209	121,827	7,404	235,723	140,704	14,500	125,574	5,462
462	Trinity & Brazos Valley .....	101,533	41,309	149,786	24,297	29,019	9,140	69,835	9,692	141,983	7,803	3,500	4,303	40,592
128	Ulster & Delaware .....	62,918	75,717	144,554	16,212	10,769	2,243	46,371	2,506	78,100	66,454	3,300	63,273	3,846
543	Western Maryland .....	494,051	116,418	637,860	86,141	65,186	11,851	201,556	12,268	377,002	260,858	21,000	240,105	-39,724
934	Western Pacific .....	368,591	120,955	500,080	79,706	38,126	26,896	177,945	20,533	343,206	156,874	14,350	139,323	—
TWO MONTHS OF FISCAL YEAR, 1912.														
291	Ann Arbor .....	\$219,562	\$126,795	\$371,510	\$47,371	\$36,821	\$9,544	\$121,724	\$14,704	\$230,164	\$141,346	\$27,971	\$117,417	\$37,612
354	Arizona Eastern .....	238,733	62,950	320,381	42,450	23,012	5,083	84,432	14,117	169,094	151,287	9,400	141,945	43,062
661	Atlanta, Birmingham & Atlantic .....	325,534	136,234	487,821	55,520	75,973	32,045	184,794	17,218	365,550	122,271	21,000	101,271	16,377
166	Atlantic & St. Lawrence .....	136,375	71,597	220,260	81,020	43,746	8,669	91,528	10,588	230,848	10,588	13,317	23,905	-16,364
166	Atlantic City .....	145,968	493,675	665,403	40,339	21,822	8,239	255,862	3,626	329,888	335,515	14,000	312,622	23,055
21	Belt Ry. Co. of Chicago .....	44,722	31,088	50,100	1,545	149,567	11,937	149,567	11,937	244,237	200,485	14,000	189,485	14,235
233	Canadian Pacific Lines in Maine .....	40,360	125,376	57,610	25,768	57,610	10,184	56,970	25,768	156,939	31,563	14,000	40,186	40,186
1,025	Chicago & Alton .....	833,484	271,735	431,885	386,448	76,720	859,814	62,767	1,817,634	899,721	—	73,000	870,431	-22,118
616	Chicago, Indianapolis & Louisville .....	310,075	1,160,202	152,497	160,634	28,206	366,618	26,916	744,871	415,331	—	45,000	370,331	-10,318
476	Chicago, Rock Island & Gulf .....	111,373	440,198	71,561	31,285	20,498	149,708	16,540	289,592	150,606	—	19,003	131,013	38,928
190	Detroit, Grand Haven & Milwaukee .....	214,222	405,747	50,850	50,552	14,623	167,036	8,555	291,616	114,131	—	5,760	108,287	83,041
612	Duluth, South Shore & Atlantic .....	202,271	242,737	98,094	56,922	23,442	21,878	402,061	21,878	402,061	182,876	36,000	152,631	-60,214
395	Georgia Southern & Florida .....	183,305	143,780	40,321	13,468	152,685	17,742	301,956	17,742	301,956	76,812	18,814	57,998	-7,014
347	Georgia Southern & Atlantic .....	644,569	447,326	1,668,716	170,877	172,199	40,624	427,319	27,963	838,992	329,734	63,270	266,175	139,309
351	Hocking Valley .....	1,043,810	186,558	1,317,923	189,582	191,349	15,594	363,271	787,682	539,241	—	83,000	447,196	-82,476
108	Indiana Harbor Belt .....	494,494	206,341	45,494	58,581	12,314	300,263	109,779	9,321	300,263	109,779	11,000	108,100	70,101
1,159	International & Great Northern .....	494,494	206,341	45,494	58,581	12,314	300,263	109,779	9,321	300,263	109,779	11,000	108,100	70,101
760	Kansas City, Mexico & Orient .....	401,632	1,343,592	196,242	36,166	571,679	46,244	1,062,806	280,786	—	—	40,000	204,154	-8,435
3,769	Minneapolis, St. Paul & Sault Ste. Marie .....	67,035	260,512	73,708	71,159	17,363	133,527	15,063	310,820	—	—	13,500	-63,800	41,012
1,345	Missouri, Kansas & Texas .....	1,158,869	421,853	476,659	545,525	90,801	2,900,438	4,840,227	2,487,450	1,731,081	39,265	248,056	1,507,290	127,145
3,916	Missouri Pacific .....	840,741	654,597	1,607,409	448,764	207,637	47,035	831,747	56,765	1,591,947	15,462	45,000	34,828	-292,231
2,664	New Orleans, Texas & Mexico .....	3,092,592	906,374	4,414,566	853,579	1,015,053	124,751	1,861,693	143,377	3,998,443	416,123	165,200	247,368	-556,857
264	New Orleans, Texas & Mexico .....	40,413	193,235	39,388	27,488	9,238	9,065	13,9787</						



REVENUES AND EXPENSES OF RAILWAYS.

MONTH OF SEPTEMBER, 1911.

Name of road.	Mileage operated at end of period.	Operating revenues			Operating expenses			Net operating revenue (or deficit).	Outside operations, net.	Taxes.	Operating income (or loss).	Increase (or decrease) comp. with last year.
		Freight.	Passenger.	Total, inc. misc.	Maintenance of way and structures.	Of equipment.	Traffic.	Trans- portation.				
Alabama & Vicksburg.....	142	\$85,635	\$41,852	\$137,557	\$20,599	\$27,201	\$3,863	\$43,795	\$36,612	\$4,600	\$17,236	—\$3,917
Alabama Great Southern.....	309	265,397	99,236	398,461	35,892	9,900	10,076	120,656	120,401	15,048	17,236	—\$3,917
Arizona Eastern.....	366	111,138	32,218	151,426	29,706	9,900	2,323	40,636	38,829	1,807	1,807	—\$1,905
Atchison, Topeka & Santa Fe.....	7,613	4,890,377	1,884,271	7,559,334	1,202,553	1,134,796	168,018	2,069,788	2,620,980	31,871	2,301,109	—408,136
Atlantic Coast Line.....	4,301	1,723,917	619,996	2,356,739	340,549	382,464	37,424	830,749	862,810	107,000	755,810	—149,609
Baltimore & Ohio.....	4,433	6,305,287	1,505,245	8,279,300	1,099,786	1,410,220	149,481	2,638,424	2,825,274	18,206	2,508,286	—95,829
Baltimore & Ohio System Terminal.....	77	3,266	139,954	35,511	14,585	35,511	1,064	52,329	28,012	849	10,655	—7,029
Belt Ry. Co. of Chicago.....	627	255,561	70,635	340,370	29,538	11,677	3,919	88,236	162,521	9,250	153,271	—34,972
Bessemer & Lake Erie.....	21	—	—	219,610	15,191	26,532	439	77,091	94,457	5,500	88,957	—8,323
Boston & Maine.....	203	918,092	43,133	970,757	81,686	133,223	12,764	203,103	438,862	7,000	524,895	—85,616
Buffalo & Susquehanna R. R.....	2,242	2,244,849	1,717,046	4,250,286	728,089	566,181	47,426	1,951,516	866,421	17,670	705,505	—4,867
Buffalo & Susquehanna R. R.....	265	140,041	9,662	154,335	15,433	28,703	1,513	37,657	29,227	2,600	26,627	—17,591
Butte, Anaconda & Pacific.....	91	43,067	11,675	56,875	6,203	26,704	549	23,050	—1,979	1,400	—3,492	—5,739
Butte, Anaconda & Pacific.....	572	717,912	103,895	847,252	114,468	168,314	8,864	262,470	276,874	17,000	260,179	—81,321
Butte, Anaconda & Pacific.....	46	72,729	13,607	99,583	9,883	17,630	654	38,477	24,834	2,000	22,834	—2,470
Carolina, Clinchfield & Ohio.....	238	149,615	16,084	172,685	12,032	21,695	5,051	34,161	91,954	8,000	84,063	—40,995
Carolina, Clinchfield & Ohio of S. C.....	17	9,299	1,350	10,649	1,350	69	939	2,440	4,354	500	6,010	—3,642
Central New England.....	276	235,545	34,477	282,812	59,832	19,045	1,376	69,311	131,521	9,000	122,623	—17,493
Central Vermont.....	411	221,285	129,991	377,379	43,920	53,947	6,882	155,108	108,069	12,200	96,866	—13,733
Charleston & Western Carolina.....	340	130,659	29,568	167,899	30,318	18,321	2,877	53,498	59,015	5,000	54,015	—14,113
Chesapeake & Ohio Lines.....	2,241	2,313,892	521,003	2,950,327	409,038	519,183	45,332	806,803	60,823	93,100	1,024,741	—19,620
Chicago & Alton.....	1,025	845,507	396,612	1,338,728	198,001	253,155	40,070	446,569	369,660	36,500	331,024	—1,743
Chicago & Eastern Illinois.....	1,275	1,006,108	267,367	1,357,992	172,949	257,806	27,401	442,199	416,780	38,500	377,370	—33,592
Chicago & Erie.....	269	373,365	68,050	481,997	93,512	86,066	21,964	199,207	71,512	16,450	55,062	—20,983
Chicago & Northwestern.....	7,754	4,442,106	1,905,272	6,966,113	985,076	821,819	102,543	2,484,626	2,454,456	275,000	2,182,118	—136,261
Chicago, Burlington & Quincy.....	9,074	5,301,906	2,118,206	8,084,806	997,156	1,251,850	146,307	2,322,666	3,186,384	264,412	2,921,739	—10,607
Chicago Great Western.....	1,406	824,338	293,651	1,207,117	132,030	143,836	47,301	426,431	400,832	33,037	367,795	—65,027
Chicago, Indiana & Southern.....	359	269,542	30,576	309,140	56,860	57,901	7,211	109,422	90,133	1,900	88,233	—58,909
Chicago, Indianapolis & Louisville.....	616	384,091	167,008	599,149	74,741	74,599	16,550	153,522	225,251	25,500	202,751	—3,808
Chicago, Milwaukee & Puget Sound.....	2,058	1,058,305	267,164	1,369,364	108,149	137,597	47,178	492,961	504,597	79,333	512,268	—10,937
Chicago, Milwaukee & St. Paul.....	7,511	3,963,290	1,468,174	5,962,267	1,169,469	823,596	116,098	2,257,062	1,499,594	17,400	1,482,194	—624,116
Chicago, Peoria & St. Louis.....	255	100,721	30,574	139,090	20,212	30,854	7,103	60,074	57,407	4,300	10,800	—7,883
Chicago, Rock Island & Pacific.....	7,551	3,510,523	1,837,987	5,697,410	914,413	719,658	157,189	2,049,207	1,716,065	206,775	1,498,658	—17,448
Chicago, St. Paul, Minneapolis & Omaha.....	1,743	851,642	475,528	1,423,784	223,692	137,004	29,815	486,903	518,034	67,803	452,621	—150,197
Chicago, Terre Haute & Southeastern.....	351	134,000	19,150	156,368	24,055	22,210	2,785	44,989	55,637	8,700	47,223	—
Cincinnati, Hamilton & Texas Pacific.....	337	662,105	147,630	849,055	72,717	165,354	19,878	226,510	347,796	21,800	326,712	—6,067
Cincinnati, Hamilton & Dayton.....	1,014	645,195	169,991	915,971	95,586	144,458	20,909	359,650	278,062	40,816	237,246	—1,043
Cincinnati, Northern.....	245	97,375	21,135	124,606	22,117	33,286	2,458	42,680	33,986	5,700	28,286	—653
Cleveland, Akron & Cincinnati.....	344	231,819	76,069	328,001	50,951	53,971	4,075	106,890	106,761	21,000	85,761	—17,176
Cleveland, Cincinnati, Chic. & St. Louis.....	2,010	1,766,949	742,301	2,743,121	296,885	376,818	70,956	952,856	995,686	100,000	894,229	—244,845
Colorado Midland.....	337	147,970	31,379	194,111	23,612	31,745	7,023	78,516	47,789	8,000	39,783	—6,328
Colorado Southern.....	1,194	503,624	159,807	707,595	93,547	134,264	10,293	209,712	239,958	24,700	215,258	—67,420
Cumberland Valley.....	162	193,610	63,144	268,731	43,042	30,010	4,945	76,931	105,602	5,141	100,855	—16,452
Delaware & Hudson Co.—R. R. Dept.....	851	1,490,239	346,121	1,893,826	137,050	257,355	27,192	596,798	829,019	50,276	774,899	—132,586
Delaware, Lackawanna & Western.....	930	2,355,489	752,074	3,292,480	404,618	483,583	66,650	888,268	1,344,923	178,500	1,213,047	—165,977
Denver & Rio Grande.....	2,555	1,640,096	569,238	2,306,546	335,471	365,900	55,584	748,785	753,412	73,000	683,103	—8,691
Denver, Northwestern & Pacific.....	214	84,081	30,887	122,867	15,043	15,001	2,139	36,665	50,872	3,131	47,741	—3,131
Detroit & Mackinac.....	353	68,538	30,487	105,551	20,332	13,608	2,042	31,284	35,836	8,100	26,913	—8,836
Detroit, Toledo & Ironton.....	441	135,212	15,418	161,450	27,482	23,199	2,945	73,814	28,302	7,528	20,595	—2,797
Duluth & Iron Range.....	190	1,015,873	20,033	1,046,738	87,473	57,633	871	148,650	148,650	42,168	704,746	—42,165
Duluth, Missabe & Northern.....	328	1,014,201	39,132	1,063,005	97,841	72,707	2,235	143,204	736,023	43,358	703,298	—583,470
Duluth, South Shore & Atlantic.....	616	1,067,763	101,107	1,168,870	46,000	26,345	1,832	171,385	181,917	18,070	103,847	—7,384
El Paso & Southern Western Co.....	901	456,001	75,344	563,530	83,827	82,616	11,884	171,283	206,615	21,076	185,537	—34,726
Elgin, Joliet & Eastern.....	841	758,207	854,053	1,612,260	80,938	146,873	3,952	222,829	369,632	16,725	352,907	—132,057
Erie.....	1,995	3,207,887	854,053	4,362,518	673,900	712,362	93,084	1,359,860	1,462,132	163,026	1,288,556	—55,180
Florida East Coast.....	583	112,407	73,427	185,834	55,557	47,913	3,889	92,254	6,041	15,500	—9,458	—
Galveston, Harrisburg & San Antonio.....	1,338	731,062	244,664	1,022,801	108,099	115,033	28,829	323,848	422,303	30,442	387,434	—17,718
Georgia.....	307	226,061	78,931	321,222	24,767	37,960	10,272	116,104	124,664	2,100	122,564	—52,372
Grand Rapids & Indiana.....	587	250,394	209,391	499,102	44,161	66,522	10,880	172,160	191,532	22,964	168,617	—36,963
Great Northern.....	7,344	4,798,356	1,338,554	6,540,356	642,924	578,860	107,412	1,537,949	3,557,059	278,503	3,310,479	—530,406
Gulf & Ship Island.....	307	116,589	38,156	168,578	168,578	30,317	2,586	42,939	60,846	3,716	57,130	—6,805
Gulf, Colorado & Santa Fe.....	1,603	743,015	254,284	1,059,245	194,966	144,600	26,961	370,659	293,367	35,761	257,606	—30,880
Houston East & West Texas.....	190	79,617	28,814	114,241	15,468	9,640	1,784	32,441	51,743	4,416	47,327	—13,039
Houston & Texas Central.....	789	456,782	171,445	668,045	56,113	68,552	18,692	203,724	302,321	24,975	276,299	—50,262
Illinois Central.....	4,755	3,353,520	1,227,160	5,183,464	833,748	1,072,700	114,257	1,796,645	3,943,250	230,997	1,001,730	—276,687
Iowa Central.....	558	251,074	53,884	317,687	34,470	45,369	6,836	128,214	94,481	9,648	84,833	—45,299
Indiana Harbor Belt.....	108	—	—	233,516	25,556	30,955	2,839	92,885	75,011	5,500	78,671	—
Kansas City Southern.....	827	549,533	141,813	780,190	79,501	103,754	27,097	259,973	281,138	34,612	246,526	—61,768
Lake Erie & Western.....	886	380,230	99,327	507,698	58,283	78,632	13,836	174,881	171,341	13,000	158,341	—27,287
Lake Shore & Michigan Southern.....	1,662	2,766,927	1,106,659	4,388,141	503,200	525,474	74,857	1,311,640	1,900,331	135,000	1,769,805	—354,648
Lehigh Valley.....	96	117,775	125,302	230,386	20,386	16,349	1,165	40,767	42,052	3,500	38,552	—2,409
Lehigh Valley.....	1,430	2,810,023	492,186	3,413,193	385,390	601,065	89,517	1,118,256	1,154,267	105,200	1,035,668	—21,803
Long Island.....	398	298,107	697,016	1,035,767	109,210	115,586	13,448	432,986	343,338	53,553	384,614	—81,929

## REVENUES AND EXPENSES OF RAILWAYS.

MONTH OF SEPTEMBER, 1911.—(CONTINUED.)

Mileage operated at end of period.	Name of road.	Operating revenues			Operating expenses			Net operating revenue (or deficit).	Outside operations, net.	Operating income (or loss).	Increase (or dec.) comp. with last year.	
		Freight.	Passenger.	Total.	Way and structures.	Maintenance of equipment.	Traffic. portation.					General.
255	Louisiana & Arkansas.....	91,167	17,593	114,163	22,473	15,875	27,870	4,590	73,180	3,150	37,833	893
207	Louisiana Western .....	95,327	49,663	153,312	13,559	21,227	46,398	6,464	93,078	6,402	51,683	16,084
4,704	Louisiana & Nashville .....	3,384,555	1,094,458	4,750,658	756,380	822,033	9,313	86,529	3,149,876	148,950	1,449,176	170,975
199	Louisville, Henderson & St. Louis.....	66,298	41,888	115,902	22,032	10,626	32,638	2,742	43,516	3,000	40,917	4,152
1,165	Maime Central .....	602,124	383,872	1,042,897	207,412	111,347	337,899	22,355	687,289	313,174	313,174	40,127
1,804	Michigan Central .....	1,726,998	797,365	2,792,505	288,645	331,382	960,724	40,949	1,681,128	110,000	1,007,074	437,084
322	Midland Valley .....	72,857	35,540	115,931	26,668	20,880	38,530	5,939	94,951	15,555	15,555	—9,776
1,027	Minneapolis & St. Louis.....	262,484	133,829	425,526	50,158	50,040	170,398	12,088	293,387	111,690	111,690	—91,505
3,769	Minneapolis, St. Paul & Sault Ste. Marie .....	643,346	551,743	2,614,456	236,347	275,974	46,471	698,402	1,305,375	1,176,012	436,884	—
1,345	Missouri, Kansas & Texas of Texas.....	727,745	343,272	1,125,131	230,780	90,241	22,045	446,789	816,856	287,077	—69,382	—
1,114	Mobile & Ohio.....	638,786	128,281	910,330	105,595	180,729	315,536	30,373	666,325	24,595	218,595	—9,797
64	Monongahela .....	98,927	2,245	102,417	15,113	5,940	185	1,991	44,239	1,900	56,278	2,880
404	Morgan's L. & Tex. R. R. & S. S. Co. ....	251,304	95,160	366,715	48,272	52,894	10,886	145,690	269,847	74,775	24,351	—24,351
1,255	Nashville, Chattanooga & St. Louis.....	685,031	279,531	1,034,817	147,660	190,348	36,316	775,622	215,106	234,049	234,049	23,052
165	Nevada Northern .....	100,419	11,867	115,378	11,369	14,863	411	3,692	53,770	57,107	57,107	2,733
195	New Orleans & North Eastern.....	213,733	51,162	283,082	27,656	55,493	9,022	94,037	197,613	9,250	73,027	2,171
282	New Orleans Great Northern.....	109,729	30,732	149,269	23,188	16,048	2,709	42,788	16,048	55,891	55,891	6,740
404	New Orleans, Mobile & Chicago.....	109,974	31,720	149,500	22,739	16,915	2,685	44,435	94,119	55,381	50,920	—6,240
3,591	New York Central & Hudson River.....	5,338,774	3,258,720	9,631,976	1,223,503	1,310,553	192,809	3,124,105	219,984	6,070,954	3,094,390	395,271
561	New York Central & St. Louis.....	746,238	155,856	942,266	127,020	106,800	46,255	130,348	647,998	44,000	249,465	17,624
2,091	New York, New Haven & Hartford .....	2,513,417	2,627,308	5,649,466	650,890	628,477	42,734	1,961,552	3,432,601	2,032,653	109,079	—
565	New York, Ontario & Western .....	507,624	162,560	789,731	135,961	137,012	17,111	578,791	216,865	150,788	202,900	—
112	New York, Philadelphia & Norfolk.....	218,150	41,914	280,649	49,478	31,552	10,326	12,347	201,028	17,917	193,144	72,454
152	New York, Susquehanna & Western.....	181,474	53,873	260,583	31,008	24,431	1,894	92,532	156,445	17,873	90,685	9,928
2,004	Norfolk & Western.....	2,930,770	423,756	3,476,360	423,356	607,385	51,571	944,450	2,088,182	115,000	1,275,026	76,206
607	Norfolk Southern .....	163,716	73,815	258,040	30,047	34,353	80,817	13,029	164,136	7,500	85,766	6,445
472	Northern Central .....	854,828	227,620	1,142,734	133,828	193,063	14,411	542,269	25,631	909,202	194,065	—11,882
6,016	Northern Pacific .....	4,101,120	1,515,101	6,008,309	867,605	547,168	92,940	75,418	3,318,607	300,415	2,444,600	—322,273
1,667	Northern Short Line .....	1,310,886	444,789	1,869,518	243,429	136,763	23,363	33,592	859,008	1,010,510	880	—
1,864	Oregon-Washington R. R. & Nav. Co. ....	1,060,309	512,316	1,669,435	207,066	121,616	48,357	490,968	595,859	763,576	688,274	—
296	Pecos & Northern Texas.....	123,007	31,175	161,173	22,436	27,802	41,937	4,861	99,017	62,156	58,709	14,362
1,415	Pennsylvania Co. ....	6,515,479	839,572	4,851,284	639,183	808,352	1,507,719	80,405	3,107,957	1,573,740	—301,205	—
3,978	Pennsylvania R. R. ....	9,192,923	3,202,394	13,752,647	1,600,241	2,590,786	181,730	4,786,136	353,321	9,512,214	4,421,884	—442,184
351	Peoria & Eastern .....	187,055	72,263	258,618	46,163	50,088	106,278	5,306	240,777	73,430	62,920	—54,621
2,331	Pere Marquette .....	1,009,790	423,639	1,558,618	168,835	206,745	39,888	639,458	32,114	1,087,040	471,579	81,971
713	Philadelphia, Baltimore & Washi- gton..	810,703	696,136	1,658,798	214,502	255,537	23,435	629,507	42,079	1,165,060	493,738	73,185
215	Pittsburgh & Lake Erie.....	1,266,616	141,136	1,450,159	205,267	252,674	12,363	232,692	699,705	30,530	719,958	—109,687
1,467	Pittsburgh, Cincinnati, Chic. & St. Louis ..	2,388,914	799,055	3,446,458	472,894	589,214	66,826	1,149,494	3,63,465	2,361,864	1,184,594	—38,686
83	Richmond, Fredericksburg & Potomac.....	95,207	76,360	189,650	20,399	33,675	2,808	68,080	6,364	131,526	57,124	11,990
468	Rutland .....	157,062	139,993	331,075	38,184	37,607	8,012	118,275	298,808	10,645	111,622	—923
319	St. Joseph & Grand Island.....	100,673	41,487	154,863	20,612	17,168	5,054	4,899	103,720	5,711	45,542	30,624
4,732	St. Louis & San Francisco.....	2,142,586	1,021,110	3,405,930	488,176	467,005	98,412	1,118,316	2,264,085	1,141,845	980,229	—80,958
509	St. Louis, Brownsville & Mexico.....	136,334	61,448	213,015	39,015	14,323	2,789	7,788	126,155	4,500	82,365	62,061
9	St. Louis Merchants' Bridge Terminal.....	—	231	144,465	21,902	10,313	416	68,417	5,729	106,595	32,170	—33,688
243	St. Louis, San Francisco & Texas.....	65,584	28,168	100,600	20,603	16,110	41,102	4,201	13,740	920	17,505	—
796	St. Louis Southwestern.....	469,440	120,161	621,000	51,745	114,460	28,905	145,481	363,764	257,236	237,080	—16,638
703	St. Louis Southwestern of Texas.....	261,828	98,314	385,447	40,562	77,917	125,036	17,010	272,112	10,000	103,087	39,141
727	St. Antonio & Aransas Pass.....	379,113	123,145	522,551	75,868	54,992	5,203	138,961	170,909	285,123	237,438	6,334
364	Santa Fe, Prescott & Phoenix.....	76,878	31,898	116,630	21,224	12,545	38,099	2,548	79,959	2,329	34,342	1,669
7,988	Southern .....	3,475,605	1,537,454	5,424,254	636,307	952,121	132,156	1,735,023	3,600,284	1,823,970	1,639,366	114,972
280	Southern in Mississippi.....	51,974	33,330	92,533	22,447	6,326	3,239	3,364	70,150	5,217	17,166	11,054
1,884	Southern Pacific Co. ....	83,611	17,123	105,047	41,131	23,705	1,773	4,372	111,861	—	—	—
6,183	Southern Railway & New York.....	4,729,007	2,679,409	7,973,821	812,756	773,719	145,624	1,956,696	4,011,229	3,962,592	3,687,822	120,375
80	Syracuse, Birmingham & New York.....	54,604	46,833	112,900	18,756	5,579	2,784	7,405	67,394	30,285	39,285	—7,963
293	Tennessee Central .....	89,720	43,975	141,936	20,599	18,075	3,867	2,368	45,505	6,220	38,152	—10,788
35	Terminal R. R. Ass'n of St. Louis.....	266	219,092	33,348	19,581	19,581	617	70,809	29,874	89,219	72,098	—12,740
458	Texas & New Orleans.....	329,117	83,320	331,522	46,803	51,445	6,904	125,725	84,339	239,316	5,221	80,958
1,884	Texas & Pacific .....	971,502	361,285	1,419,655	145,030	227,953	30,522	521,503	41,732	966,740	125,488	—67,028
440	Toledo & Ohio Central.....	432,465	64,682	518,983	56,926	55,094	5,850	7,757	274,125	25,706	213,400	11,664
247	Toledo, Peoria & Western .....	60,008	44,884	111,075	18,855	22,835	2,469	38,239	44,858	7,500	41,358	—
450	Toledo, St. Louis & Western.....	262,997	40,830	325,650	25,787	61,002	8,307	116,541	85,808	6,800	20,417	—28,383
3,506	Union Pacific .....	3,318,737	990,697	4,692,263	418,924	404,715	95,856	1,124,878	95,963	2,140,336	2,389,257	—57,499
9	Union R. R. of Baltimore.....	106,238	22,088	129,704	11,627	12,970	961	5,714	2,293	20,595	109,109	—10,242
37	Union R. R. of Pennsylvania.....	234,606	24,606	266,387	448,308	11,449	100	134,189	3,375	264,595	183,713	4,869
871	Vicksburg .....	530,394	40,625	63,884	127,833	166,732	24,577	33,032	19,337	661,691	28,301	170,395
177	Vicksburg, Shreveport & Pacific.....	63,884	44,625	114,453	18,383	21,064	3,245	35,274	4,619	31,848	6,300	24,818
240	Virginia & Southwestern.....	132,599	15,285	152,155	16,952	28,555	1,832	38,694	23,349	89,382	58,063	—
474	Virginian .....	372,530	26,286	409,700	44,970	74,429	4,901	109,493	168,353	5,341	14,000	159,694
2,514	Washington .....	1,679,012	704,361	2,582,575	321,874	419,798	84,063	926,932	66,856	1,819,523	763,052	—200,291
35	Washington Southern .....	29,629	39,804	88,540	31,883	4,776	1,292	33,453	2,824	38,161	71,635	691,765
355	West Jersey & Seashore.....	146,304	448,352	641,181	89,246	106,835	13,793	243,229	10,732	463,835	177,346	32,453
457	Wheeling & Lake Erie.....	633,154	58,950	732,387	99,518	112,912	8,469	221,006	13,380	23,477	149,197	—
1,371	Yazoo & Mississippi Valley.....	492,008	232,917	781,778	172,639	123,850	16,162	279,463	28,133	620,247	31,175	—867



REVENUES AND EXPENSES OF RAILWAYS.

THREE MONTHS OF FISCAL YEAR, 1912.

Name of road.	Mileage operated at end of period.	Operating revenues			Maintenance of way and structures, equipment.		Operating expenses			General.	Total.	Net operating revenue (or deficit).	Outside operations, net.	Taxes.	Operating income (or loss).	Increase (or decrease) comp. with last year.
		Freight.	Passenger.	Total.	inc. misc.	Way and structures.	Of equipment.	Traffic.	Trans- portation.							
Alabama & Vicksburg.....	142	\$223,253	\$134,748	\$358,001	\$66,357	\$76,786	\$11,315	\$128,302	\$15,804	\$298,564	\$85	\$13,800	\$74,967	\$48,875		
Alabama Great Southern.....	309	691,821	331,343	1,023,164	1,118,949	235,205	31,372	342,093	25,768	757,810	—699	44,544	315,895	17,287		
Arizona Eastern.....	3661	349,871	94,168	444,039	72,156	32,911	7,406	123,169	19,048	256,690	—	21,960	193,851	37,876		
Atchison, Topeka & Santa Fe.....	76132	13,939,197	5,775,698	19,714,895	3,784,204	3,522,110	454,692	6,109,546	472,393	14,342,945	—	866,882	6,205,227	—1,556,464		
Atlantic Coast Line.....	4,5013	4,536,400	1,872,639	6,409,039	1,016,532	1,147,961	119,480	2,470,134	211,655	4,965,762	1,936,215	—	1,615,215	321,000	114,443	
Baltimore & Ohio System.....	4,433	18,073,720	4,425,570	22,499,290	3,115,882	4,214,918	474,098	7,719,437	487,464	16,011,799	—138,137	726,287	7,014,749	—108,401		
Baltimore & Ohio Chicago Terminal.....	77	600,697	8,903	609,600	406,819	98,746	2,913	157,256	16,759	332,543	332,543	308,701	22,153	41,500	—10,928	
Baltimore & Annapolis.....	6274	600,697	191,448	792,145	841,892	144,513	12,236	226,658	17,837	369,390	369,390	294,942	7,912	278,442	16,500	—7,912
Belt Ry. Co. of Chicago.....	21	—	—	—	664,332	46,279	1,984	226,658	17,837	369,390	369,390	294,942	—	278,442	16,500	—7,912
Bessemer & Lake Erie.....	263	2,759,226	130,448	2,889,674	2,917,902	246,485	29,648	606,829	24,326	1,323,371	1,323,371	1,594,531	—	1,573,531	232,016	346,616
Boston & Maine.....	2,2243	6,396,884	5,024,082	11,420,966	1,934,641	1,561,305	129,812	5,262,077	263,278	9,151,113	3,147,153	73,540	2,697,635	523,058	—342,002	
Buffalo & Susquehanna R. R.....	265	410,561	28,381	438,942	456,710	97,728	4,214	159,212	19,615	357,364	357,364	99,346	—	91,546	7,800	—15,366
Buffalo & Susquehanna R. R. (cont.).....	91	125,863	37,281	163,144	169,617	81,186	4,214	159,212	19,615	357,364	357,364	99,346	—	91,546	7,800	—15,366
Buffalo, Rochester & Pittsburgh.....	572	2,114,088	341,779	2,455,867	2,356,264	396,785	30,132	768,441	49,711	1,702,093	1,702,093	834,167	—	784,196	51,000	—149,953
Butte, Anaconda & Pacific.....	46	220,442	39,233	259,675	278,048	28,655	2,208	115,527	7,035	205,565	205,565	72,483	—	66,483	6,000	—24,706
Carolina, Clinchfield & Ohio.....	238	457,508	48,063	505,571	521,035	35,515	15,534	102,037	23,303	241,726	241,726	179,309	1,137	22,000	258,446	134,813
Central New England.....	17	24,235	4,309	28,544	29,282	226	2,824	7,456	1,270	13,121	13,121	16,161	—	14,661	1,500	8,505
Central Vermont.....	276	653,880	101,357	755,237	793,779	155,350	3,846	205,249	7,155	430,857	430,857	362,922	203	27,000	336,125	80,600
Charleston & Western Carolina.....	411	656,794	369,494	1,026,288	1,110,690	144,706	23,579	469,511	24,924	809,970	809,970	369,720	3,091	35,700	277,111	52,188
Chesapeake & Ohio Lines.....	340	330,552	100,148	430,700	453,862	60,978	8,123	151,984	12,090	320,390	320,390	133,472	—	118,472	15,000	34,127
Chicago & Alton.....	2,2419	6,695,429	1,638,521	8,333,950	1,105,920	1,572,497	158,165	2,458,836	186,359	5,481,777	5,481,777	3,205,301	17,351	279,300	294,332	5,273
Chicago & Eastern Illinois.....	1,257	2,345,022	1,250,095	3,595,117	629,885	639,603	16,791	1,306,383	94,791	2,786,703	2,786,703	1,269,380	—8,431	1,095,500	1,151,439	—20,374
Chicago & Erie.....	1,275	1,862,522	866,689	2,729,211	486,049	692,342	87,096	1,294,910	12,792	2,683,189	2,683,189	1,275,291	—3,765	115,056	1,159,456	—47,487
Chicago & Northwestern.....	7,754	12,922,128	5,817,916	18,740,044	2,531,924	2,351,924	63,618	3,704,431	28,245	11,477,144	11,477,144	6,504,932	9,990	825,000	5,699,922	75,072
Chicago, Burlington & Quincy.....	9,0748	14,705,630	6,446,889	21,152,519	3,381,515	3,852,987	411,695	6,832,194	557,611	15,036,002	15,036,002	8,108,926	—25,237	793,237	7,290,452	303,514
Chicago Great Western.....	1,496	2,214,847	888,481	3,103,328	3,361,566	464,967	143,775	1,253,552	106,340	2,396,109	2,396,109	965,457	493	1,668,839	99,111	86,839
Chicago, Indiana & Southern.....	35910	772,990	91,340	864,330	888,611	129,482	23,610	325,110	24,576	685,959	685,959	202,652	2,012	41,700	162,964	98,479
Chicago, Indianapolis & Louisville.....	616	1,132,539	477,083	1,609,622	1,759,351	227,238	54,507	560,140	46,502	1,118,769	1,118,769	640,582	—	67,508	573,082	—6,510
Chicago, Milwaukee & Puget Sound.....	2,0581	3,186,133	743,995	3,930,128	292,278	393,551	160,356	1,429,106	51,340	2,326,927	2,326,927	1,737,501	68,581	237,999	1,568,083	—18,420
Chicago, Milwaukee & St. Paul.....	7,511	10,584,015	4,291,396	14,875,411	3,055,513	3,852,987	319,119	6,354,111	283,411	12,330,026	12,330,026	4,172,239	34,081	720,231	3,486,089	—1,333,103
Chicago, Peoria & St. Louis.....	255	307,309	105,703	413,012	434,541	60,607	21,939	178,959	16,575	367,431	367,431	67,110	—	12,900	54,210	1,269
Chicago, Rock Island & Pacific.....	7,53112	9,684,279	5,392,718	15,076,997	16,090,481	2,683,511	473,233	6,037,867	89,607	11,867,679	11,867,679	4,222,802	—30,199	620,205	3,572,398	—426,586
Chicago, St. Paul, Minneapolis & Omaha.....	1,743	2,180,247	1,343,244	3,523,491	3,895,240	717,657	84,269	1,411,585	89,607	2,767,997	2,767,997	1,127,243	5,506	193,841	938,908	—46,524
Chicago, Terre Haute & Southeastern.....	331	388,026	60,256	448,282	458,937	75,166	8,435	131,361	21,829	312,517	312,517	146,430	12	26,100	120,332	—
Cincinnati, New Orleans & Texas Pacific.....	337	1,870,955	468,091	2,339,046	2,177,307	436,624	58,251	666,020	51,608	1,429,873	1,429,873	976,632	1,721	65,400	912,953	—40,168
Cincinnati, Hamilton & Dayton.....	1,01413	1,968,329	523,098	2,491,427	2,796,640	297,660	58,408	1,088,620	56,121	1,929,129	1,929,129	867,519	—	116,853	750,667	182,072
Cincinnati Northern.....	245	263,057	76,734	339,791	358,292	69,606	8,387	123,919	12,919	279,401	279,401	78,991	—	60,200	62,891	—13,226
Cleveland, Akron & Cincinnati.....	344	647,921	245,269	893,190	958,349	161,170	11,984	331,555	16,200	652,851	652,851	385,498	—	60,200	245,298	—16,845
Cleveland, Cincinnati, Chic. & St. Louis.....	2,01014	5,120,792	2,375,307	7,496,099	815,127	1,105,980	255,103	2,825,919	158,235	5,280,255	5,280,255	2,873,471	—4,577	290,000	2,578,894	1,066,510
Colorado Midland.....	337	378,569	107,015	485,584	530,644	72,176	21,966	209,413	16,015	408,839	408,839	121,805	—	24,000	97,546	10,640
Colorado Southern.....	1,19415	1,448,631	515,418	1,964,049	2,094,846	396,997	34,130	671,332	65,481	1,395,860	1,395,860	698,966	—3,176	74,100	621,710	—64,470
Cumberland Valley.....	162	520,851	185,641	706,492	739,428	131,245	87,169	226,723	21,920	481,162	481,162	288,266	—	15,424	244,321	—88,576
Delaware & Hudson Co.—R. R. Dept.....	8310	4,339,533	1,112,252	5,451,785	3,655,772	746,305	74,286	1,793,189	132,086	3,110,439	3,110,439	2,533,575	—1,701	144,968	3,386,906	370,280
Delaware, Lackawanna & Western.....	930	6,756,524	2,252,038	9,008,562	9,595,575	1,418,308	199,153	2,648,442	193,859	5,888,167	5,888,167	3,707,584	113,121	465,500	3,355,205	66,671
Denver & Rio Grande.....	2,555	4,548,013	1,647,783	6,195,796	6,472,248	935,040	171,248	2,121,626	143,621	4,431,374	4,431,374	2,040,874	15,563	213,000	1,843,437	—262,799
Denver, Northwestern & Pacific.....	214	194,245	166,712	360,957	376,592	46,592	8,451	96,816	9,118	206,200	206,200	170,390	—	161,337	17,419	—17,419
Detroit, Mackinac.....	33	192,503	108,164	300,667	319,638	57,221	8,452	201,587	16,848	369,100	369,100	32,600	—	24,751	781,044	—28,047
Detroit, Toledo & Ironmont.....	44117	2,917,427	653,300	3,570,727	3,014,007	306,509	3,295	201,587	29,609	948,662	948,662	2,065,345	15,593	121,633	1,95	

## REVENUES AND EXPENSES OF RAILWAYS.

THREE MONTHS OF FISCAL YEAR, 1912—(CONTINUED).															
Mileage operated at end of period.	Name of road.	Operating revenues				Operating expenses				Net operating revenue (or deficit).	Outside operations, net.	Taxes.	Operating income (or loss).	Increase (or dec.) comp. with last year.	
		Freight.	Passenger.	Total.	Inc. misc.	Way and structures.	Of equipment.	Traffic.	Trans- portation.						General.
4,704 <sup>25</sup>	Louisville & Nashville.....	9,578,037	3,281,807	13,630,489	2,166,243	2,475,357	273,392	4,188,417	255,523	9,358,932	4,271,557	+1,072	446,850	3,825,779	466,397
199	Louisville, Henderson & St. Louis.....	189,703	1,168,434	3,287,329	81,534	34,643	12,976	97,565	9,085	23,932	92,526	1,116	9,000	84,642	1,080
1,165 <sup>26</sup>	Louisville, Henderson & St. Louis.....	1,588,840	1,168,434	2,927,704	620,907	308,639	29,282	972,217	65,748	1,996,793	930,911	-374	123,934	806,603	103,151
1,804 <sup>27</sup>	Louisville, Henderson & St. Louis.....	4,733,104	2,482,430	7,956,355	781,677	813,122	209,849	2,726,621	131,546	4,728,815	3,227,541	16,878	330,000	2,914,418	1,083,754
322	Midland Valley.....	210,981	1,052,627	3,384,475	84,168	64,193	10,091	112,135	16,856	287,443	51,036	59	16,453	34,642	3,597
1,027	Minneapolis & St. Louis.....	727,073	382,469	1,199,382	135,389	153,858	31,516	489,821	35,544	846,128	353,254	-66	58,475	294,713	-141,103
3,769 <sup>28</sup>	Minneapolis, St. Paul & Sault Ste. Marie.....	4,753,662	1,710,612	6,832,987	713,006	821,499	137,272	1,988,839	132,209	3,792,825	3,040,162	64,670	421,529	2,683,303	564,029
1,345	Missouri, Kansas & Texas of St. Louis.....	1,567,986	997,870	2,732,541	679,544	297,877	69,080	1,278,536	83,766	2,408,803	323,738	-3,988	67,500	2,324,249	-361,613
1,114	Missouri, Kansas & Texas of St. Louis.....	1,932,018	395,955	2,704,234	331,415	517,075	95,602	963,342	91,540	1,998,974	705,260	-3,480	73,785	627,995	-29,795
64	Monongahela.....	279,060	7,044	290,017	52,159	21,262	652	61,258	5,829	141,390	148,627	.....	5,700	142,927	3,180
404 <sup>29</sup>	Morgan's L. & Tex. R. & S. Co.....	723,685	302,510	1,082,523	146,505	167,206	38,511	418,976	37,589	808,787	273,736	-9,662	56,094	207,980	-16,066
1,255	Nashville, Chattanooga & St. Louis.....	2,002,909	823,198	3,024,934	466,876	554,202	109,389	1,090,013	74,239	2,924,720	730,236	-3,454	71,448	655,334	47,113
165	Nashville, Chattanooga & St. Louis.....	318,398	33,713	362,111	361,065	43,782	1,280	72,545	10,446	167,728	193,337	.....	13,925	179,412	-6,334
195	New Orleans & North Eastern.....	608,094	160,248	823,787	82,727	157,492	27,553	284,387	33,906	586,065	237,722	-4,641	27,750	205,331	-3,954
282	New Orleans Great Northern.....	309,095	94,026	430,414	61,141	53,395	8,026	129,965	20,330	272,857	157,557	-226	6,000	151,331	-25,961
404	New Orleans, Mobile & Chicago.....	315,062	97,800	439,198	73,178	48,290	8,194	135,247	22,399	287,308	151,890	-341	13,478	138,071	-11,276
3,591	New York Central & Hudson River.....	15,114,417	9,856,369	27,783,980	3,666,055	3,677,137	589,080	9,244,477	674,175	17,850,924	9,933,056	98,722	1,358,389	8,673,389	1,838,339
561	New York Central & Hudson River.....	2,239,447	504,107	2,839,459	386,409	290,239	51,131	1,954,433	903,169	903,169	903,169	-2,623	122,000	778,546	94,858
2,091 <sup>30</sup>	New York, New Haven & Hartford.....	7,441,845	7,544,075	16,435,194	1,867,983	1,868,387	101,167	5,885,443	449,598	10,172,578	6,272,616	399,655	945,000	5,727,271	104,933
565 <sup>31</sup>	New York, Ontario & Western.....	1,787,665	771,690	2,673,741	396,460	424,021	29,255	88,753	48,469	1,785,718	888,023	6,225	53,750	840,498	-183,725
112	New York, Philadelphia & Norfolk.....	698,098	137,003	898,424	100,640	148,185	12,585	329,650	36,522	627,582	270,842	.....	22,500	248,342	-45,267
152	New York, Susquehanna & Western.....	525,587	169,098	773,806	97,814	70,577	6,062	14,917	14,917	462,527	311,279	9,737	53,621	267,395	54,600
2,004 <sup>32</sup>	Norfolk & Western.....	8,433,474	1,251,570	10,023,934	1,314,761	1,788,414	150,118	2,722,721	175,244	6,151,258	3,872,676	-5,762	345,000	3,521,914	322,010
607	Norfolk Southern.....	452,806	248,091	773,624	88,040	99,228	18,169	205,267	38,023	493,727	279,897	2,388	22,500	255,009	9,496
472	Northern Central.....	2,319,475	660,988	3,156,740	401,918	591,988	44,635	1,516,115	70,714	2,625,370	531,370	2,458	121,010	412,818	-116,972
6,016 <sup>33</sup>	Northern Pacific.....	10,807,563	4,842,057	16,764,898	2,560,622	1,821,002	296,306	4,945,946	239,672	9,863,548	6,901,350	151,272	838,245	6,214,377	-1,175,361
1,667 <sup>34</sup>	Oregon Short Line.....	3,648,196	1,917,929	5,535,973	750,619	481,627	82,282	1,170,194	104,731	2,589,453	2,764,576	-3,970	283,773	2,481,580	-95,805
1,864	Oregon-Washington R. R. & Nav. Co.....	1,060,309	512,116	1,669,435	207,006	121,616	48,357	490,968	37,912	905,859	763,576	.....	71,332	688,274	-13,226
296 <sup>35</sup>	Pecos & Northern Texas.....	312,352	91,124	423,800	60,712	82,099	16,402	122,389	13,932	285,504	137,886	.....	10,340	127,046	-488,324
1,415	Pennsylvania Co.....	10,677,343	2,509,095	14,250,630	1,745,428	2,355,170	219,487	4,446,278	251,266	9,017,629	5,233,001	-2,048	516,838	4,714,115	-488,324
3,978	Pennsylvania R. R.....	28,090,117	9,619,487	40,237,372	4,568,956	7,631,029	535,657	14,243,803	1,025,626	28,004,569	12,232,803	-349,103	1,817,793	10,663,907	-875,878
351	Peoria & Eastern.....	562,429	202,522	828,522	125,914	117,263	18,403	324,860	17,201	603,641	224,881	.....	31,500	193,381	-69,872
2,331	Pere Marquette.....	2,695,644	1,370,116	4,435,896	505,369	617,578	120,212	1,844,450	95,713	3,183,322	1,252,574	-5,786	168,759	1,078,029	54,244
713	Philadelphia, Baltimore & Washington.....	2,472,685	2,029,754	4,956,317	636,158	802,535	74,135	1,897,121	108,917	3,518,866	1,437,451	.....	152,093	1,285,358	58,774
2,150	Pittsburgh & Lake Erie.....	3,877,413	455,072	4,368,287	439,718	586,684	45,432	930,997	70,686	2,073,512	2,294,770	-247	90,530	2,203,993	-324,523
1,467	Pittsburgh, Cincinnati, Chic. & St. Louis.....	6,953,322	2,317,363	10,347,848	1,567,592	1,821,915	204,016	3,394,154	192,290	7,179,967	3,167,881	-3,160	383,109	2,781,612	91,077
83	Richmond, Fredericksburg & Potomac.....	296,988	202,718	569,351	62,504	82,988	8,452	208,227	17,737	379,908	189,443	.....	3,000	186,443	-14,113
468	Rutland.....	464,576	386,947	963,613	124,504	82,988	24,839	347,672	19,546	650,528	313,085	.....	34,191	278,894	-25,167
319	St. Joseph & Grand Island.....	290,289	128,102	455,480	71,331	52,195	16,324	168,930	15,511	324,291	131,189	41	17,134	114,096	-17,226
4,732	St. Louis & San Francisco.....	6,032,604	3,114,972	9,877,163	1,269,965	1,364,219	261,392	3,376,734	281,020	6,553,330	3,323,833	.....	472,497	2,851,336	-123,522
509 <sup>37</sup>	St. Louis, Brownsville & Mexico.....	357,718	175,572	578,321	117,924	36,223	8,435	187,388	244,115	204,236	.....	.....	13,500	190,736	134,009
9	St. Louis Merchants' Bridge Terminal.....	752	399,320	81,785	21,564	1,336	208,964	15,521	332,770	66,550	.....	.....	17,100	49,450	-123,248
243	St. Louis, San Francisco & Texas.....	1,321,755	362,096	1,768,545	144,759	332,516	78,828	429,339	66,123	1,051,565	25,627	.....	3,641	21,986	19,068
796 <sup>38</sup>	St. Louis Southwestern.....	1,321,755	362,096	1,768,545	144,759	332,516	78,828	429,339	66,123	1,051,565	25,627	.....	3,641	21,986	19,068
703	St. Louis Southwestern of Texas.....	643,320	282,550	993,849	132,761	238,734	33,899	369,412	47,988	822,794	171,055	-657	30,000	140,398	118,483
727	San Antonio & Aransas Pass.....	882,659	357,282	1,301,487	200,163	147,422	16,253	405,508	28,713	798,059	503,428	.....	33,000	470,427	13,867
364	Santa Fe, Prescott & Phoenix.....	269,666	104,932	399,716	65,189	40,772	8,867	122,076	16,081	232,985	146,731	.....	10,996	135,735	8,878
7,088 <sup>39</sup>	Southern.....	9,501,149	4,789,041	15,487,182	1,806,819	2,569,859	408,449	5,169,906	432,184	10,387,217	5,099,965	17,967	590,379	4,527,553	276,122
280	Southern in Mississippi.....	130,375	103,816	256,733	69,075	25,560	7,038	101,914	10,524	214,111	42,622	.....	15,650	26,972	17,875
124	Southern Kansas of Texas.....	249,242	48,956	310,553	66,091	60,991	5,912	114,249	12,765	259,992	50,629	.....	5,942	44,687	-50,757
6,183 <sup>40</sup>	Southern Pacific Co.....	13,472,871	8,565,876	23											



## COURT NEWS.

The United States Supreme Court in an opinion by Justice Lurton has affirmed the judgment of the Supreme Court of Kentucky imposing a tax on all the steamships of the Southern Pacific Railroad Company that are in use for transporting passengers and freight, exempting only barges, lighters and the craft that remain permanently in certain ports. The Southern Pacific Railroad is a corporation organized under the laws of the state of Kentucky, and under special act of the Kentucky legislature which chartered it the company is required to retain an office and maintain a domicile in the state. The court holds that on such movable property as steamships, which have no regular domicile, the property shall be subject to taxes under the laws of the domicile of the owner.

The Commerce Court has ruled that the Chicago Junction Railways is a common carrier, subject to the regulation of the Interstate Commerce Commission, but that the Union Stock Yards & Transit Company of Chicago, and the Union Junction Railways & Union Stock Yards Company are not common carriers. The court says that the Interstate Commerce Commission, insofar as it held the lessor company merely as lessor to be a common carrier, was not justified. The court says that the Stock Yards Company cannot be treated as a common carrier merely because it receives two-thirds of the net revenues of the Junction company, or because its auditor acts for both companies. Judge Archibald dissented from the finding that the Junction railway was a common carrier. In his opinion the loan of tracks of the Junction railway to trunk line carries, hauling by their own motive power through trains, east or west, is not exercising any of the functions of a common carrier, even though it take tolls therefor, any more than a turnpike road on which people travel, or a toll bridge, or a canal which, without doing any towing, merely maintains a waterway for public use is a common carrier.

#### The Supreme Court Overrules the Commission in the Elevator Cases.

The United States Supreme Court has overruled the Interstate Commerce Commission in its refusal to permit railways to make an allowance for the elevation of grain at Missouri river points.

The chief contention that first brought the case before the commerce commission was that an allowance made by the Union Pacific to Peavey & Co., grain dealers and operators of elevators, amounted to a rebate.

The original complaint was made by the Chicago Great Western, the C., B. & Q. and the A., T. & S. F. The petitioners alleged that the Union Pacific entered into a contract with Peavey & Co., under which the latter company erected grain elevators at Council Bluffs, Iowa, and at Kansas City for the transfer of grain for the public from incoming cars of the Union Pacific to outgoing cars of the connecting lines at these terminal points, and for this service the Union Pacific agreed to pay Peavey & Co. 1¼ cents per 100 lbs.

The complaining railways alleged that the facts were that "the elevators of Peavey & Co. were not built for such purposes, and never had, to any considerable extent, if at all, thus transferred grain for the public, but were built and had been used solely and exclusively for their own use in the grain trade."

The commission held that Peavey & Co. would profit unjustly by the allowance of the Union Pacific. The Circuit Court on appeal overruled the commission.

In its decision the Supreme Court held that the order of the commission reducing the allowance for elevation, to the cost of the service, namely, three-fourths of a cent, should be allowed to stand. The court also allowed to stand the so-called Peavey order of 1909, in so far as it confined the allowance to grain reshipped within ten days. Except as to these two points, the decree of the United States Circuit Court for Western Missouri in regard to the elevator charges was affirmed.

Associate Justices McKenna and Hughes dissented from the above opinion.

In announcing the opinion of the court Justice Holmes made the remark that "the law does not attempt to equalize the fortunes of men."

## Railway Officers.

### ELECTIONS AND APPOINTMENTS.

#### Executive, Financial and Legal Officers.

G. M. Bosworth, vice-president of the Canadian Pacific at Montreal, Que., will hereafter have supervision of the telegraph, the hotel, and the sleeping, dining, and parlor car departments, and the chiefs of these several departments will report to him.

David R. Burbank, who has been elected secretary of the Illinois Central, with office at New York City, as has been announced in these columns was born on September 15, 1871, at Henderson, Ky., and was educated at the University of Minnesota. He began railway work on May 1, 1894, as a clerk on the Illinois Central and in November, 1906, he was appointed assistant secretary of that road, which position he held at the time of his recent appointment as secretary, as above noted.

William Burnett Scott, whose election as vice-president and general manager of the Union Pacific, with office at Omaha, Neb., was recently announced in these columns, was born August 18,

1862, at Hamilton, Ont. He was educated at Walkers' Academy at Guelph, Ont., and began railway work in 1873 as a messenger boy on the Grand Trunk Railway at Guelph. He was then consecutively freight clerk of the same road at Guelph and telegraph operator at Toronto; train despatcher of the Canadian Pacific at Winnipeg; chief despatcher and trainmaster on construction of the Great Northern between Minot, N. D., and Helena, Mont., and superintendent of telegraph of the Chicago Great Western. For seven years from 1890 he was trainmaster of the Atchison, Topeka



W. B. Scott.

& Santa Fe at Chicago, and was then for five years superintendent of the Gulf, Colorado & Santa Fe at Temple, Tex. He has been with the Harriman Lines since 1902, first as superintendent of the Galveston, Harrisburg & San Antonio at San Antonio, Tex. In June, 1904, he was appointed general superintendent of the Houston & Texas Central, and a year later was appointed assistant director of maintenance and operation of the Harriman Lines, with office at Chicago. Following the recent reorganization of the Harriman Lines he was chosen vice-president and general manager of the Union Pacific as above.

#### Operating Officers.

E. E. Stoupt has been appointed trainmaster of the Southern division of the Chicago Great Western, with office at Des Moines, Iowa.

G. V. Thompson has been appointed car distributor of the Bangor & Aroostook with office at Bangor, Maine, succeeding J. H. Cavanaugh, transferred to other duties.

W. T. Hall, assistant superintendent of the Houston & Texas Central at Houston, Tex., has been appointed division superintendent, with office at Ennis, Tex., succeeding M. Sheehan, resigned.

F. S. Rockwell, trainmaster of the Chesapeake & Ohio at St. Albans, W. Va., has been appointed superintendent of the Cincinnati division, with office at Covington, Ky. W. F. Echols succeeds Mr. Rockwell.

D. J. Malone, assistant superintendent of the Southern Pacific at Odgen, Utah, has been appointed assistant superintendent of the Utah division of the Oregon Short Line, with office at

Salt Lake City, Utah, succeeding George Ross, assigned to other duties.

L. K. Marr, general yardmaster of the Pennsylvania Railroad at New York, has been appointed trainmaster, with office at New York, succeeding H. C. Bixler promoted, and his former position has been abolished. C. D. Kober, instructor at New York, has been appointed assistant trainmaster, succeeding to the duties of Mr. Marr.

L. H. Phetteplace, superintendent of the Carolina, Clinchfield & Ohio, at Erwin, Tenn., has been appointed general superintendent in charge of operation and maintenance, with office at Erwin, and the master mechanic and car service agent who have heretofore reported to the general manager will, in future, report to the general superintendent.

James A. McCrea, general superintendent of the Long Island Railroad at New York City, has been appointed general manager, succeeding to the duties as general manager, previously performed by President R. Peters. H. W. Thornton, assistant general superintendent at Long Island, succeeds Mr. McCrea. A portrait of Mr. Thornton and a sketch of his railway career were published in the *Railway Age Gazette* of March 3, 1911, p. 431.

C. Christie, superintendent of the St. Lawrence division of the New York Central & Hudson River with office at Watertown, N. Y., who was recently granted leave of absence on account of ill health, as has been announced in these columns, has been appointed special representative of the transportation department, with headquarters at Albany, and will perform such duties as may be assigned to him by P. E. Crowley, assistant general manager, at Albany.

Guy Adams, manager of mail traffic of the Chicago, Rock Island & Pacific, the St. Louis & San Francisco and the Chicago & Eastern Illinois, effective January 1, has been appointed manager of mail traffic of all the Frisco Lines, including the two latter roads and the St. Louis, Brownsville & Mexico, the New Orleans, Texas & Mexico, the Fort Worth & Rio Grande, the Beaumont, Sour Lake & Western, the Orange & Northwestern, the Louisiana Southern and the Paris & Great Northern, with offices at Chicago, St. Louis and Washington.

H. B. Green, who has been appointed superintendent of the Baltimore & Ohio, at Wheeling, W. Va., began railway work on June 1, 1880, on the Cleveland, Lorain & Wheeling division of the Baltimore & Ohio at Medina, Ohio, and four years later he became telegraph operator at the same place. In April, 1887, he was promoted to agent and operator, and in May of the following year was again promoted to agent and yardmaster at Ulrichsville, and in October, 1898, he was transferred to Cleveland in the same capacity. On December 1, 1901, he was appointed general yardmaster at Cleveland, and was later division agent, and then assistant trainmaster. In April, 1906, he was appointed trainmaster of the Cleveland division, of the same road. Mr. Green was promoted to assistant superintendent at Cleveland on May 25, 1911, which position he held at the time of his recent appointment as superintendent, as above noted.

#### Traffic Officers.

J. C. Williams has been appointed traffic manager of the Akron, Canton & Youngston, with office at Akron, Ohio.

James W. Flannery has been appointed commercial agent of the Georgia Southern & Florida, with office at Cincinnati, Ohio, succeeding George H. Wilcox, promoted.

F. C. Gifford has been appointed general agent of the Denver & Rio Grande, with office at Chicago, succeeding J. T. Bowe, resigned. Mr. Gifford will also represent the Western Pacific.

L. B. Burford, chief of tariff bureau of the Erie Railroad and subsidiary lines at New York City, has been appointed general agent with office at Baltimore, Md. R. D. Tilt, succeeds Mr. Burford.

J. B. Bartholomew, until recently assistant general freight agent of the International & Great Northern at Palestine, Tex., has been appointed agent of the Texas Tariff Bureau, with office at Houston, Tex.

C. F. Osborn has been appointed general agent of the Erie Railroad and the Erie Despatch, with office at Denver, Colo.

W. J. Lloyd, who has been acting general agent at Denver, has been appointed traveling agent at that place.

Walter E. Blachley has been appointed district agent of the freight and passenger departments of the Union Line of the Pennsylvania Lines, with office at Winnipeg, Man. Keith Watson has been appointed passenger and freight solicitor, with office at Winnipeg.

Ingersoll Goodwin, city passenger agent of the Chicago & Alton and the Toledo, St. Louis & Western at Chicago, has been appointed special passenger agent, with office at Chicago, succeeding H. A. Hilbourne, resigned. H. A. Crowe succeeds Mr. Goodwin.

G. P. Molloy has been appointed traveling freight agent of the Texas & Pacific, with office at New Orleans, La. W. M. Bottorff, soliciting freight agent of the Frisco Lines at Dallas, Tex., has been appointed soliciting freight agent of the Texas & Pacific, with office at Dallas.

E. C. Runte, city passenger agent of the Louisville & Nashville at New Orleans, La., has been appointed district passenger agent, with office at New Orleans. The office of division passenger agent at New Orleans, from which J. K. Ridgely has recently been promoted to assistant general passenger agent, has been abolished.

C. S. Bather, assistant to the freight traffic manager of the St. Louis & San Francisco at St. Louis, Mo., has been appointed general freight agent of the Texas City Transportation Company and the Texas City Terminal Company, with office at Texas City, Tex., succeeding R. E. Tipton, resigned to accept service with another company.

George H. Clark has been appointed division freight agent of the New York Central & Hudson River and the West Shore, with office at Utica, N. Y., succeeding Angus S. Gamble, Malone, N. Y., assigned to other duties, and Wreford L. McCarty has been appointed division freight agent at Corning, N. Y., succeeding Edward F. Kershner, resigned.

Garland Tobin, traveling passenger agent of the International & Great Northern at Houston, Tex., has been appointed southwestern passenger agent of the Missouri Pacific and the St. Louis, Iron Mountain & Southern, with office at San Antonio, Tex., succeeding W. E. Fitch, resigned to become district passenger agent of the International & Great Northern at San Antonio.

Herbert Thompson, who has been appointed assistant general freight agent of the Erie Railroad, with office at Buffalo, N. Y., as has been announced in these columns, was born on February 6, 1880, at New York City, and was educated at St. Paul's School, Concord, N. H. He began railway work in September, 1897, with the Erie Railroad and held various positions in the general freight department, until he became chief clerk in October, 1904. He was promoted to chief of tariff bureau in 1907, and two years later was made assistant to the general freight agent, which position he held at the time of his recent appointment as assistant general freight agent of the same road.

Arthur S. Learoyd, who was appointed general freight agent of the Delaware, Lackawanna & Western, with office at New York City, as has been announced in these columns, was born on August 14, 1873, at Taunton, Mass. He graduated from Harvard University in 1895, and in July of that year began railway work with the Fitchburg Railroad, now a part of the Boston & Maine, at Worcester, Mass. From 1895 to 1898, he was in the local station service at Worcester, Mass., and from 1899 to 1900 was traveling freight agent. He was appointed chief clerk to the traffic manager of the Delaware, Lackawanna & Western in January, 1901, and the following May was appointed division freight agent of the same road, and since 1907 was assistant general freight agent of that company.

Robert D. Pusey, whose appointment as general passenger agent of the Louisville & Nashville, with office at Louisville, Ky., has been announced in these columns, was born February 28, 1876, at Brandenburg, Ky. He was educated in the public schools and began railway work in April, 1893, with the Pittsburgh, Akron & Western, and in October, 1896, when that road was purchased by the Lake Erie & Western and its name changed to the Northern Ohio, he was transferred to Indianapolis, where he was employed in the accounting department. For three years



from January, 1901, he was in the office of the general passenger agent, and he was then appointed chief clerk. He left the Lake Erie & Western to become assistant general passenger agent of the Louisville & Nashville in September, 1910, from which office he has just been promoted.

John S. Wood, whose appointment as assistant general freight agent of the Lehigh Valley, with office at New York, has been announced in these columns, began railway work in 1888 in the division freight office of the Grand Trunk at Hamilton, Ont. He held various clerical positions at that place and was then transferred to Montreal, Que. In December, 1892, he went to the Lehigh Valley as a clerk in the freight department, and from February, 1899, to January, 1904, was soliciting freight agent, then division freight agent of that road at Buffalo, N. Y. From May, 1906, to August, 1910, he was assistant general freight agent of the Lehigh Valley at New York, and was then out of railway work to November, 1911, when he returned to the service of the Lehigh Valley and resumed his former position as assistant general freight agent.

John H. Crawford, whose appointment as freight traffic manager of the Delaware, Lackawanna & Western, with office at New York City, as has been announced in these columns, was born on December 23, 1861, and was educated in the common schools of Burlington, Iowa. He began railway work in 1876 in the operating and traffic departments of the Chicago, Burlington & Quincy, and from 1886 to 1891 he was contracting freight agent of the same road at St. Louis, Mo. He was then appointed general agent of the Lackawanna line at the same place, and from 1897 to July, 1900, was general manager of the same line at Chicago. From July, 1900, to March, 1903, he was general eastern freight agent of the Delaware, Lackawanna & Western, at New York. Mr. Crawford was appointed general freight agent of the same road in March, 1903, and at the time of his recent appointment was assistant freight traffic manager of that road at New York.

William F. Griffiths, whose appointment as assistant general passenger agent of the Delaware, Lackawanna & Western, with office at New York City, has been announced in these columns, was born on March 2, 1871, at Philadelphia, Pa., and was educated in the common schools. He began railway work in November, 1887, as a clerk, and for ten years was on different roads, on what was then known as the Burlington Route, now the Chicago, Burlington & Quincy, as clerk, rate clerk and chief rate clerk. He then became chief rate clerk, and afterwards chief clerk in the passenger department of the Kansas City, Pittsburg & Gulf, now a part of the Kansas City Southern. In August, 1899, he was appointed chief rate clerk of the Delaware, Lackawanna & Western, and on January 1, 1905, was made chief clerk in the passenger department, which position he held at the time of his recent appointment as assistant general passenger agent of the same road.

Frank J. Watson, who has been appointed assistant general freight agent of the Grand Trunk, with office at Montreal, Que., as has been announced in these columns, was born on January 12, 1866, and was educated in Toronto schools and colleges. He began railway work in 1884, as secretary to the assistant general freight agent of the Northern & Northwestern Railways, now part of the Grand Trunk, and was later secretary to the general freight agent of the same roads. In 1899, he was appointed way-bill inspector of the Grand Trunk, and since that time has been in the continuous service of that company. From 1891 to 1892 he was traveling freight agent of the Western division, and then for four years traveling freight agent of the Eastern division. From 1896 to 1897 he was chief clerk in the freight department of the Southern division, and division freight agent of the Northern division, and was then appointed division freight agent of the Eastern division of the same road.

James B. Keefe, whose appointment as assistant general freight agent of the Delaware, Lackawanna & Western, with office at New York City, has been announced in these columns, was born on November 28, 1865, at Brockport, N. Y., and was educated in the high schools. He began railway work in April, 1881, on the Iowa Central as a telegraph operator, and was later agent and operator on the Chicago & Northwestern. He was then train despatcher and later chief claim clerk. From 1889 to 1891 he was with the Cleveland, Cincinnati, Chicago & St. Louis, and the

Chesapeake & Ohio in the freight claim department, and then went to the New York & New England, now a part of the New York, New Haven & Hartford, as general yard master at Boston, Mass. In 1893 he became general agent of the Union Pacific at Colorado Springs, Colo., and the following year was traveling freight agent on the Pacific coast, and later general western freight and passenger agent at Denver of the Texas & Pacific. In 1896 he was appointed train despatcher of the Mexican Central, and was later assistant to the superintendent of that road at San Luis Potosi, Mex., since which time he has been consecutively general yardmaster of the New York, New Haven & Hartford at Boston, Mass., chief clerk to the general claim agent of the Missouri, Kansas & Texas and traveling freight agent of the Oregon Short Line. Mr. Keefe went to the Delaware, Lackawanna & Western in 1900, as telegraph operator and general yardmaster at Buffalo, N. Y. He was later traveling freight agent at Buffalo, and at the time of his recent appointment was division freight agent of the same road at Scranton, Pa.

George A. Cullen, whose appointment as passenger traffic manager of the Delaware, Lackawanna & Western, with office at New York City, has been announced in these columns, was born



G. A. Cullen.

at St. Louis, Mo., and began railway work with the Wabash Railroad. He was later a rate clerk in the passenger department of the Missouri Pacific, and in 1895 was made chief rate clerk and rate sheet compiler of the Southern Passenger Association at Atlanta, Ga. In 1896 he was appointed chief clerk in the passenger department of the Plant System at Savannah, and later in the same year was appointed chief clerk of the Western Passenger Association at Chicago. Two years later he became general agent of the same association in charge of the immigrant bureau at

New York. Mr. Crawford went to the Delaware, Lackawanna & Western in 1900, as general western passenger agent at Chicago, and in 1906, was appointed general passenger agent of the same road at New York, which position he held at the time of his recent appointment as passenger traffic manager.

#### Engineering and Rolling Stock Officers.

George H. Ballantyne has been appointed division engineer of the Western Pacific, with office at Elko, Nev., succeeding J. H. Knowles, promoted.

G. W. Cuyler has been appointed general foreman of the Rock Island Lines at Cedar Rapids, Iowa, succeeding T. Kilpatrick, resigned to go to another company.

W. C. Stone has been appointed foreman of the car department of the Missouri Pacific, with office at De Soto, Mo., succeeding V. M. Robinson, resigned to accept service with another company.

A. B. Enbody, road foreman of engines of the Central Railroad of New Jersey, at Mauch Chunk, Pa., has been appointed assistant master mechanic of the Lehigh and Susquehanna division, with office at Mauch Chunk.

H. C. Manchester, superintendent of transportation of the Maine Central at Portland, Me., has been appointed superintendent of motive power and equipment of the Delaware, Lackawanna & Western, with office at Scranton, Pa., succeeding T. S. Lloyd, resigned. Effective December 1.

Ward Crosby, principal assistant engineer of the Carolina, Clinchfield & Ohio, at Johnson City, Tenn., has been appointed chief engineer, with office at Johnson City, succeeding to the

duties as chief engineer of M. J. Caples, vice-president, general manager and chief engineer, resigned to go to the Chesapeake & Ohio, as has already been announced in these columns. (See an item under Operating Officers.)

J. F. Deems, general superintendent of motive power, rolling stock and machinery of the New York Central Lines at New York City, having resigned, as has already been announced in these columns, that position has been abolished. Each superintendent of motive power and rolling stock on the various lines in the system will have full charge of his department, reporting to their general managers. R. B. Kendig, general mechanical engineer, will, in future, report direct to the president. R. T. Shea, general inspector of piece work, and C. W. Cross, superintendent of apprentices, retain their present positions.

#### Purchasing Officers.

H. W. Hoffmeister, storekeeper of the Cincinnati, Hamilton & Dayton at Indianapolis, Ind., has been appointed storekeeper at Ivorydale, Ohio, succeeding C. B. Figgins, resigned. H. K. Martin succeeds Mr. Hoffmeister.

G. H. Robison, general storekeeper of the Oregon Short Line at Pocatello, Idaho, has been appointed assistant general manager, in charge of purchases and supplies, with office at Salt Lake City, Utah, succeeding A. E. Hutchinson, resigned to become purchasing agent of the Southern Pacific at Portland, Ore. T. A. Martin succeeds Mr. Robison.

#### OBITUARY.

F. H. Graves, a Chicago banker and president of the White Pass & Yukon Route, died of heart disease at Ottawa, Ont., on November 13.

Oliver Rowe, inspector of transportation of the Union Pacific and Southern Pacific, died at a hospital in Cheyenne, Wyo., on November 14, from injuries received in a train accident which occurred on October 28.

George L. Thayer, district passenger agent of the Missouri, Kansas & Texas, at New York City, died of heart disease on November 14, at New York. Mr. Thayer was born at Newport, R. I. in 1856. He was for a time with the Fall River Line, which operates a steamship line from New York to New England points, and then had charge at Ellis Island of the transportation of immigrants. His next position was on the Indiana, Illinois & Iowa, at St. Louis, Mo. He then went to the Missouri, Kansas & Texas, and came to New York in 1897.

William H. Taylor, master mechanic of the New York, Susquehanna & Western, at Stroudsburg, Pa., died suddenly while on a journey on November 9, at the Delaware, Lackawanna & Western station at Hoboken, N. J. Mr. Taylor was born at Belfast, Ireland, in 1845, and two years later he came to America. He was educated in the public schools, and was for five years at the Cooke Locomotive Works at Paterson, N. J., and after completing his trade he went to the Central Railroad of New Jersey, remaining with that company for 11 years as engine despatcher and roundhouse foreman. He went to the N. Y. S. & W. as train despatcher at West End, Jersey City, and when the shops were changed from Paterson to Stroudsburg, Mr. Taylor went to the latter place as master mechanic. Mr. Taylor had been in the employ of the New York, Susquehanna & Western since 1885.

Charles A. Reed of the firm of Reed & Stem, architects, died on November 13, at his home in New York at the age of 54 years. Mr. Reed had been designing railway stations for the past 30 years. Perhaps his best known work was in connection with the terminal improvements of the New York Central & Hudson River at New York City. He was the executive head of the Grand Central Terminal Architects, composed of the firms of Reed & Stem and Warren & Wetmore, which organization made the plans for the new Grand Central Terminal. Reed & Stem have designed a number of other important stations for the New York Central Lines, including one at Detroit, another at Utica, and a third at Yonkers. The firm has designed over 100 railway stations, including the large union station now under construction at Norfolk, Va.; also stations for the Great Northern, the Northern Pacific, the Chicago Great Western, the Michigan Central and the Norfolk & Western.

## Equipment and Supplies.

### LOCOMOTIVE BUILDING.

THE NORFOLK & WESTERN is in the market for 25 locomotives.

THE MISSOURI PACIFIC has ordered 1 Mallet locomotive from the Baldwin Locomotive Works.

THE PENNSYLVANIA RAILROAD has ordered 3 Mallet locomotives from the Baldwin Locomotive Works.

THE ILLINOIS CENTRAL, as mentioned in the *Railway Age Gazette* of November 10, has ordered 10 Pacific type locomotives from the Baldwin Locomotive Works. The dimensions of the cylinders of these locomotives will be 25 in. x 26 in., the diameter of the driving wheels will be 75 in., and the total weight in working order will be 239,000 lbs.

### CAR BUILDING.

THE MISSOURI & NORTH ARKANSAS is making inquiries for 100 forty-ton flat cars.

THE CAMBRIA & INDIANA has ordered 300 hopper cars from the Cambria Steel Company.

THE GRAND TRUNK has ordered 1,000 hopper cars and 1,000 box cars from the Pressed Steel Car Company.

THE TEXAS & PACIFIC COAL COMPANY, Thurber, Texas, has ordered 100 gondola cars from the Pressed Steel Car Company.

THE DELAWARE, LACKAWANNA & WESTERN has sent 1,000 miscellaneous freight cars to the American Car & Foundry Company to be reinforced with steel underframes.

THE SOUTHERN RAILWAY has ordered 1,200 gondola cars from the Pressed Steel Car Company, 500 gondola cars from the Mt. Vernon Car Manufacturing Company, and 500 box cars from the Lenoir Car Works.

THE BALTIMORE & OHIO has ordered 2,000 box cars and 2,000 all-steel gondola cars from the Standard Steel Car Company, 2,000 all-steel gondola cars from the Cambria Steel Company, 1,500 composite gondola cars from the Pressed Steel Car Company, and 500 box cars from the Mt. Vernon Car Manufacturing Company.

THE NEW YORK CENTRAL LINES have ordered 1,500 all-steel hopper cars from the American Car & Foundry Company, and 350 gondola cars from the Standard Steel Car Company, and is now in the market for 1,000 box cars and 114 passenger cars. This company has placed orders for 10,000 box cars, including 2,000 mentioned in the *Railway Age Gazette* of October 27, and the 3,000 for the Pittsburgh & Lake Erie, mentioned in the *Railway Age Gazette* of November 3. The total order was placed as follows: 5,000 with the American Car & Foundry Company; 3,000 with the Pressed Steel Car Company, and 2,000 with the Pullman Company. These cars will be distributed as follows: Pittsburgh & Lake Erie, 3,000; Lake Shore & Michigan Southern, 3,000; New York Central & Hudson River, 2,000; Michigan Central, 1,500; Cleveland, Cincinnati, Chicago & St. Louis, 500.

### IRON AND STEEL.

THE CENTRAL OF NEW JERSEY has ordered 10,000 tons of rails from the Pennsylvania Steel Company.

THE LOUISVILLE & NASHVILLE has ordered 50,000 tons of rails from the Tennessee Coal, Iron & Railroad Company.

THE CHICAGO, BURLINGTON & QUINCY has ordered 20,000 tons of rails from the Illinois Steel Company, and 30,000 tons from the Colorado Fuel & Iron Company.

GENERAL CONDITIONS IN STEEL.—Orders continue to come in at about the same rate and the Steel Corporation is still operating at about 75 per cent. of its capacity. Although rail and plate buying has shown large increases during the past week, the orders in other departments have fallen off. November is expected to be very similar to October as regards earnings, for the production has been high and the prices low.



## Supply Trade News.

The American Locomotive Company, New York, has received an order from the Paulista Railway, San Paulo, Brazil, for one steam shovel.

The New York, New Haven & Hartford is having 21 locomotives of various types, including Pacific, Atlantic, ten-wheel, and mogul, fitted with superheaters for experimental purposes. The Locomotive Superheater Company, New York, will furnish the superheaters.

The Pennsylvania Tank Car Company, Sharon, Pa., has been formed with \$50,000 capital to make, rebuild and repair tank cars. G. F. Wood-Smith, Frick building, Pittsburgh, is president and general manager. It is expected that the construction of the plant will soon be under way.

George Franklin Pond has been made manager of the Philadelphia, Pa., territory of the Wheeler Condenser & Engineering Company, Cartaret, N. J., with office in Philadelphia. Walter G. Stephan has been made manager of the Cleveland, Ohio, territory of the same company, with office in Cleveland.

The General Electric Company, Schenectady, N. Y., has received an order from the Haskell & Barker Car Company, Michigan City, Ind., for one motor generator set, 97 induction motors and a switch board. The Haskell & Barker Company is remodeling its entire electrical equipment and is changing from alternating current to direct-current, motor drive.

Maximilian M. Schneider for the past 11 years chief designer of the Pullman Company, Chicago, died at his residence in that city on November 12. Mr. Schneider was born in Tolz, Bavaria, April 1, 1857. His

father was chief forester of Bavaria for a number of years, and his mother was a relative of the eminent French chemist, Lavoisier. Mr. Schneider graduated from the University of Munich, where he received his engineering education, and later studied three years in scientific schools in Paris. He served with distinction in the Franco-Prussian war and was decorated with the iron cross by King William for his bravery at the battle of Gravelotte. For a number of years before going to the Pullman Company he was employed in Chicago by the Crane Company as constructing engineer. In recent years he has been the chief designer of the Pullman Company and was responsible for important improvements in Pullman cars. In addition to his unusual attainment as an engineer, Mr. Schneider displayed considerable ability as an artist and sculptor. His most notable work was the design of steel sleeping cars. He was able not only to make the plans for the underframe, but also the designs for the inside finish, whether of woodwork or of metal, the lamps, the metal trimmings and also the color scheme for the decoration. Perhaps his most exhaustive work in car design was the finish for the entire Pullman train exhibited at the Trans-Mississippi Exposition held in St. Louis, Mo., in 1904.

The Jerguson Manufacturing Company, Boston, Mass., has made the Joseph M. Brown Company, Chicago, its representative in Illinois, Missouri, Minnesota and Michigan for Klinger type water gages and spare glasses. Dravo, Doyle & Company, Pittsburgh, Pa., have been made the representatives of the same company in Pennsylvania, Ohio, Maryland, Delaware and West Virginia for the same products.



M. M. Schneider.

The U. S. Metal & Manufacturing Company, New York, has recently taken over the general sales agency in the United States for Texoderm, a material used for coach seat upholstery, made by the Sillocks-Miller Company, South Orange, N. J. This company has also taken over the selling agency, in the southern and middle western states, for gears and pinions made by the Tool Steel Gear & Pinion Company, Cincinnati, Ohio.

The American Blower Company, Detroit, Mich., has filed an application for a charter for the Canadian Sirocco Company, Windsor, Ont. This company has acquired about four and one-half acres, and will proceed at once with the construction of the erecting shop, 50 ft. x 200 ft., steel and concrete construction; also the office building. The foundry building will probably be started in the spring. This company will hold the exclusive patent rights for the manufacture in Canada of Sirocco fans and blowers. The Canadian Sirocco Company will also make the full line of the American Blower Company's products, consisting of fans, blowers, heating, ventilating, drying apparatus, steam engines, steam traps, etc.

The Hyman-Michaels Company, Chicago, has been formed to take over the relaying rail and scrap iron business of the Block Pollack Company, Cincinnati, Ohio, in Chicago and St. Louis, Mo., and the Pollack Steel Company, Cincinnati, will have charge of the Pollack business in Cincinnati, as was mentioned in the *Railway Age Gazette* of November 10. The Hyman-Michaels Company has taken over property valued at \$500,000 and has assumed all the obligations of the old company at Chicago and St. Louis. It has a capitalization of \$250,000. Isaac Block is president, Joseph Hyman is first vice-president, and Joseph Michaels is second vice-president and secretary, with offices in the Peoples Gas building, Chicago.

### TRADE PUBLICATIONS.

**DERAILS.**—The Hayes Track Appliance Company, Richmond, Ind., has published an illustrated leaflet on its double-end Hayes derails, showing the different models and sizes.

**DENVER & RIO GRANDE.**—The passenger department of the Denver & Rio Grande has published a booklet entitled *The Lands of Utah*, which contains a description of Utah's agricultural development and gives special mention of the private and government reclamation projects now under way and completed. The booklet is illustrated with orchard and dairy scenes and contains an up-to-date map of Utah.

**COALING STATIONS.**—The Roberts & Schaefer Company, Chicago, has issued bulletin No. 23, describing installations of the Holmen or balanced bucket type locomotive coaling stations built by that company. These stations are built of wood, steel or concrete and have a storage capacity of from 80 to 1,000 tons and an elevating capacity of from 40 to 125 tons per hour. The booklet contains some very good reproductions of photographs and line drawings of stations in use throughout the United States and Mexico.

**POWER TRANSMISSION MACHINERY.**—The Jeffrey Manufacturing Company, Columbus, Ohio, has published a very full 150-page catalog on Jeffrey power transmission machinery. It describes and gives full information on the various products of this company. It gives the standard methods of key seating, and shows the sizes and dimensions of couplings, hangers, blocks, counter shafts, belt tighteners, clutches and quills. A feature is made of the Jeffrey improved split iron pulley, a complete list of the Jeffrey gears is given, and useful information on a number of other subjects is included. Prices are given.

**ASBESTOS, MAGNESIA AND ELECTRICAL SUPPLIES.**—The H. W. Johns-Manville Company, New York, has issued a remarkably full 350-page catalog of its large line of products, most of which are made of asbestos, magnesia or indurated fiber. These products include pipe and boiler coverings; packings; cements; roofings; waterproofing materials; heat, cold, sound and electrical insulators; Transite asbestos wood; Transite smoke jacks; Ceilinite insulation; conduit for pipes or wires; fuses; Linolite electric lamps and accessories, rubber valves, etc. The catalog is illustrated, contains full descriptions, list prices and a complete index.

## Railway Construction.

### New Incorporations, Surveys, Etc.

**ALABAMA, TENNESSEE & NORTHERN.**—This road has been extended from York, Ala., to Ward, 9 miles. Wm. Toxey, chief engineer, York, Ala.

**ARIZONA EASTERN.**—A new branch, called the Chandler branch, has been opened for business from Chandler Junction, Ariz., south to Bowen, 11.6 miles. L. H. Long, chief engineer, Tucson, Ariz.

**BANGOR & AROOSTOCK.**—The company has asked for authority to secure 2.74 acres of land by the right of eminent domain for yard space at Grand Island, Me. Permission is also asked to construct a spur track, 1,800 ft. long, from a point near Perham station to the mills of the Perham Lumber Company. M. Burpee, chief engineer, Houlton, Me.

**BEAUMONT, WACO & NORTHERN.**—Incorporated in Texas with \$75,000 capital, to build between Beaumont and Waco. J. F. Keith, president; C. S. Vidor, vice-president and treasurer; J. G. Reaves, vice-president and general manager, and B. S. Woodhead, secretary; Beaumont, Tex.

**BELLE FOURCHE & SPEARFISH (Electric).**—Incorporated in South Dakota with \$5,000 capital, and headquarters at Belle Fourche, S. D. The plans call for building from Belle Fourche, in Butte county, south to Spearfish, in Lawrence county, about 15 miles. The incorporators include A. A. Moodie, B. Sebastian, F. E. Harris and F. E. Duba, all of Belle Fourche.

**BROWNWOOD, NORTH & SOUTH.**—See St. Louis & San Francisco.

**CAMBRIA & INDIANA.**—This road has been opened for business from Rexis, Pa., to C. & I. Junction, 19.8 miles. T. E. Dunn, superintendent, Vintondale, Pa.

**CANADIAN NORTHERN ONTARIO.**—The Trenton division has been opened for business from Toronto, Ont., east to Trenton, 111 miles. A. F. Stewart, chief engineer, Toronto, Ont.

**CEMENT TOLINAS & TIDEWATER.**—Incorporated in California with \$500,000 capital to build from Cement, Cal., southwest to tidewater, near Suisun, about 5 miles. R. B. Henderson and A. B. Plair are directors.

**CENTRAL ARKANSAS & EASTERN.**—See St. Louis Southwestern.

**CHICAGO, MILWAUKEE & PUGET SOUND.**—An officer writes regarding the work to be carried out on the Idaho & Western, between Spokane, Wash., and Coeur d'Alene, Idaho, that work is now under way on the uncompleted section between Atlas and Coeur d'Alene, which was deferred pending adjustments of right-of-way matters. The work is being completed under a former contract by H. C. Henry. E. J. Pearson, chief engineer, Seattle, Wash. (November 3, p. 1911.)

**CHICAGO, ROCK ISLAND & PACIFIC.**—An officer writes that grading work has just been started on the Malvern & Camden, from Malvern, Ark., south to Camden, 59 miles. The C. H. Sharp Construction Co., Kansas City, Mo. has the contract. There will be two steel bridges, each 50-ft. long. Maximum grades northbound, will be 7 per cent., and southbound, 1 per cent. J. B. Berry, chief engineer, Chicago, Ill. (June 9, p. 1180.)

**CLEAR LAKE.**—According to press reports, a contract has been let to Elliott & Axman, San Francisco, Cal., for grading 6.5 miles between Hopeland, Cal., and Lakeport. C. M. Hammond, president, Upper Lake.

**CLINTON & OKLAHOMA WESTERN.**—According to press reports final surveys have been made for an extension from Butler, Okla., west to Cheyenne, about 30 miles, and work is to be started at once. G. V. McClure, chief engineer, Oklahoma City, Okla. (June 30, p. 1713.)

**COLORADO & SOUTHERN.**—The Fort Collins district on the Northern division has been extended from Wellington, Colo., north to Cheyenne Junction, Wyo., 34.2 miles. H. H. Cowan, chief engineer, Denver, Colo. (October 6, p. 690.)

**EUREKA & PALISADE.**—According to press reports this company is planning to rebuild this road from Eureka, Nev., north to Palisade, 84 miles. G. B. Abbott, superintendent, Palisade.

**FLATHEAD INTERURBAN.**—Contracts have been given to L. L. Davis, and to J. A. Roe, to build a section of this line between Whitefish, Mont., and Kalispell. Work is to be started at the Kalispell end. A. L. Jaqueth, engineer in charge. (November 3, p. 931.)

**FLORIDA EAST COAST.**—This company has opened for business a new branch from Maytown, Fla., south to Chulota, 23 miles. The line is to be extended south to Lake Okeechobee, 130 miles from Maytown, with a branch from this line at Whittier south to Bassenger, 30 miles. The Kissimmee Valley Construction Company, Jacksonville, has the contract. A. L. Hunt, engineer, St. Augustine, Fla. (September 8, p. 493.)

**FORT WORTH & SOUTHWESTERN.**—Incorporated in Texas, with \$400,000 and office at Fort Worth. The company plans to build from Fort Worth southwest through the counties of Tarrant, Johnson, Somervell, Erath, Hamilton, Coryell, Lampasas, San Saba, Llano, Mason, Gillespie, Kimble, Kerr, Bandera, Edwards, Uvalde, Kinney and Maverick, to Eagle Pass, about 350 miles. The incorporators include W. D. Morton, J. P. Farr, Glenrose; J. M. Goldstein, Milford; W. E. Harrison, W. B. Paddock, Fort Worth; D. C. Morris, Walnut Springs, and M. W. Shuler, Waco.

**GAINESVILLE & WESTERN.**—An officer writes that contracts are to be let at once for building from Gainesville, Ga., north to Robertstown, 35 miles. Work is now under way, clearing the right-of-way and getting out ties. There will be a 150-ft. steel bridge. R. M. McCombs, president, Bank of Commerce building, St. Louis, Mo., and J. F. Brooks, chief engineer, Cleveland, Ga.

**GRAND TRUNK.**—A new line has been opened for business on the Penetang sub-division from Birch, Ont., north to Tay on the Lindsay and Midland sub-division, 8.9 miles. H. G. Kelley, chief engineer, Montreal, Que.

**GRAYS HARBOR RAILWAY & POWER Co. (Electric).**—This company has plans made, it is said, to build from Cosmopolis, Wash., to a point on Willapa Harbor, Wash. Extensions are also to be made at Aberdeen and at Hoquiam. H. B. Zimmerman, manager.

**GULF, FLORIDA & ALABAMA.**—This company has bought from the Southern States Lumber Company 52 miles of standard gage road, part of which is now under construction, running from Cantonment, Fla., north via Pensacola to Local, Ala. This is to form part of a through line between Pensacola, Fla., and Jasper, Ala. G. A. Berry, chief engineer, Pensacola. (November 10, p. 975.)

**IBERIA, ST. MARY & EASTERN.**—An officer is quoted as saying that work is being pushed on the line from New Iberia, La., southeast to Berwick City, opposite Morgan City, about 50 miles. It is expected that the work will be finished to Charenton, 21 miles, about December 1, and that all the work will be finished by May, 1912. F. M. Welch, president, New Iberia. (July 21, p. 158.)

**IDAHO & WESTERN.**—See Chicago, Milwaukee & Puget Sound.

**INDIANAPOLIS, CRAWFORDSVILLE & WESTERN TRACTION.**—According to press reports this company is planning to build a 40-mile connecting link between existing electric lines in Indiana. C. E. Morgan, general manager, Crawfordsville, Ind.

**INTERCOLONIAL.**—A new branch has been opened for business from Ferona Junction, N. S., west to Sunny Brae, 12.5 miles. W. B. McKenzie, chief engineer, Moncton, N. B.

**IOWA CENTRAL.**—An officer is quoted as saying that an extension is to be built from Albia, Iowa, to St. Louis, Mo., 115 miles. The Minneapolis & St. Louis, is also to build an extension to the Canadian border. It is understood that the latter will be built north from Leola, S. D. R. G. Kenly, chief engineer, Minneapolis, Minn.

**JEFFERSON & NORTHWESTERN.**—An officer writes that this company, which was organized to build from Jefferson, Tex., on the Texas & Pacific and the Missouri, Kansas & Texas, north to Lanier, 14 miles, thence via Luanna to Camp, 31 miles, with a branch from Lanier northeast to Linden, 5 miles, has completed work to Linden. H. B. Montgomery, chief engineer, Jefferson.

**JOLIETTE & LAKE MANUAN COLONIZATION RAILWAY.**—This company, which was granted a charter to build from Montreal,



Que., and through the county of Joliette, to a connection with the National Transcontinental Railway (Grand Trunk Pacific), about 217 miles, has surveys made. The contract to build the line has been given to the British Canadian Construction Company, Ltd., Ottawa, Ont. According to the terms of the contract 60 miles is to be finished and in operation by December, 1912, and the rest of the line completed by December, 1913. Construction work is now under way between Joliette and St. Emele d L'Energie, and several miles has been graded. A larger number of men and teams are at work on the line. It is the intention to continue the rock work during the winter on the section where the line crosses the Laurentian mountains. The headquarters of the company are at Ottawa. J. A. Patten, chief engineer, St. Felix de Valois, Que.

KANSAS CITY & MEMPHIS.—An extension has been built from Cave Springs, Ark., to Clear Creek, 11 miles. M. Hays, chief engineer, Rogers, Ark. (September 22, p. 575.)

KANSAS CITY, MEXICO & ORIENT.—This road has been extended from Barnhart, Tex., west to Big Lake, 19 miles. W. W. Colpitts, chief engineer, Kansas City, Mo. (October 20, p. 815.)

MAINE CENTRAL.—Permission has been given this company to change the route of the proposed two-mile extension from Mainstream, Me., to Harmony. The new location utilizes 1,700 ft. of public road, which will have to be re-built in a new highway location. It is understood that the work will be carried out this year. T. L. Dunn, chief engineer, Portland, Me.

MALVERN & CAMDEN.—See Chicago, Rock Island & Pacific.

MEXICO NORTHWESTERN.—A branch has been opened for business on the Chihuahua division from San Antonio, Mex., to Cusihiuriachic, 13 miles. B. B. Bryant, chief engineer, Ciudad Juarez, Chih., Mex. (July 21, p. 158.)

MEXICAN RAILWAY.—This company has adopted plans, it is said, for the standardizing of its road between the City of Mexico, Mex., and Vera Cruz. All the tunnels, of which there are a number of considerable length, will be enlarged. All the grades between City of Mexico and Esperanza will be reduced and the curves lengthened, and other improvements will be made. W. T. Ingram, resident engineer, City of Mexico.

MILWAUKEE, PEORIA & ST. LOUIS.—An officer writes that the prospects of building are good, but contracts are not yet let for a line from a point opposite the city of Peoria, Ill., on the east bank of the Illinois river north, crossing the Atchison, Topeka & Santa Fe, thence via Lacon and Hennepin to Rockford, about 120 miles. Connection is to be made with the Chicago, Milwaukee & St. Paul at the Chicago, Indiana & Southern bridge at Depue. Maximum grades will be .5 of 1 per cent; maximum curvature 3 degrees. The right-of-way has been secured from Peoria to Depue, and about one-half of the line has been located. The company expects to develop a traffic in coal from the fields located at the southern end of the line. F. W. Cherry, Princeton, is back of the project. B. Schreiner, chief engineer.

MINNEAPOLIS & ST. LOUIS.—See Iowa Central.

NEW YORK SUBWAYS.—The New York Public Service Commission, First district, has announced that bids will be received on December 5, for the construction of section nine of the Lexington avenue subway in the borough of Manhattan. The plans call for the construction of a four-track double-deck subway from a point just north of 67th street to a point about seventy feet south of 79th street, with stations at 68th and 77th streets. (Nov. 3, p. 931.)

NORTHERN PACIFIC.—A contract has been given to the Weymouth Construction Company, Seattle, Wash., it is said, for building the first section of the Lake Union belt line at Seattle, between Ross station and Boren avenue. The contract is said to be worth \$225,000, and includes putting up freight stations. W. L. Darling, chief engineer, St. Paul, Minn. (October 6, p. 691.)

OREGON ELECTRIC.—An officer writes that work is now under way by Guthrie McDougall & Co., building an extension from Salem, Ore., south to Eugene, about 75 miles. L. B. Wickersham, chief engineer, Portland, Ore. (October 27, p. 860.)

OREGON ROADS.—The Fall City Lumber Company is having surveys made for a line from Fall City, Ore., to Siletz Basin. J. J. Sammonds is engineer in charge.

PITTSBURG, BINGHAMTON & EASTERN.—The New York Public Service Commission, Second district, has rescinded, cancelled and annulled its order made in February, 1908, whereby permission was granted this company for a change of route in the counties of Broome and Tioga. Since the order was issued the company went into the hands of a receiver. The present owners of the property do not intend to construct the railway.

SANTA FE, PRESCOTT & PHOENIX.—An officer writes that under the name of the Verde Valley, a branch is to be built from Cedar Glade, Ariz. to New Jerome, 38.5 miles. The contract has been let to the L. J. Smith Construction Co., Kansas City, Mo. The line is being built to provide an outlet for traffic from the Verde valley and the United Verde Copper Company's new smelter, at New Jerome. W. A. Drake, vice-president and J. A. Jaeger, chief engineer, Prescott. (November 3, p. 932.)

ST. LOUIS & SAN FRANCISCO.—The Brownwood, North & South, which has been acquired by the Frisco, has finished construction work on the line from Brownwood, Tex., north to May, 32 miles, and is now open for traffic. Surveys for an extension have been made. It is understood that the line will be extended through coal fields to a connection with the Texas & Pacific. F. G. Jonah, chief engineer, St. Louis, Mo. (July 14, p. 104.)

ST. LOUIS SOUTHWESTERN.—The Central Arkansas & Eastern, building from England, Ark., to Stuttgart, 26.5 miles, and from Rice Junction to Hazen, 20 miles, has been completed and connections have been established with the St. Louis Southwestern at England and at Stuttgart. C. D. Purdon, chief engineer, Tyler, Tex. (October 13, p. 735.)

SWANTON & ALBURG.—Incorporated in Vermont with a capital of \$100,000, and office at Barre, the company plans to build from Swanton to Alburg, 10 miles. It will connect with the St. Johnsbury & Lake Champlain at Swanton, and the Rutland Railroad at Alburg. The directors include F. S. Darling, F. G. Howland, T. H. Cave, Barre; S. Keemie, Toronto, Ont., and A. C. Percival, Montreal, Que. C. S. Mellon, president of the New York, New Haven & Hartford, is also interested in the project.

VERDE VALLEY.—See Santa Fe, Prescott & Phoenix.

TEXAS & PACIFIC.—The railroad commission of Louisiana has ordered this company to extend its spur or side track at Yellow Bayou, La., a distance of 200 ft. from the present terminus—the work is to be carried out within 30 days; also that a platform to load and unload cars be constructed at that place. C. H. Chamberlin, chief engineer, Dallas, Tex.

WEBBER FALLS, SHAWNEE & WESTERN.—This road has been opened for business from Warner, Okla., to Webber Falls, 11 miles. C. C. Goodman, general manager, Webber Falls.

## RAILWAY STRUCTURES.

KANSAS CITY, MO.—The Kansas City Terminal Company has let the contract to the Missouri Valley Bridge & Iron Works, Leavenworth, Kan., for building the foundations and piers for the new bridge over the Blue river at Sheffield, Mo. The work will cost approximately \$30,000.

MONTREAL, QUE.—According to press reports the Canadian Northern will put a 11-span bridge over the St. Lawrence river, near Montreal, between St. Genevieve and St. Dorothee.

NEW YORK, N. Y.—The New York Public Service Commission, First district, has asked for an appropriation of \$1,000,000, to pay for grade crossing elimination work within the city limits of New York. Most of this work is to be carried out on the Long Island Railroad, in the borough of Queens. There are now about 400 grade crossings within the limits of New York City.

NORTH MCGREGOR, IA.—The Chicago, Milwaukee & St. Paul has let the contract and started construction on a new brick passenger station to replace the structure which was destroyed by fire last spring. The building will be steam heated and electrically lighted, and will cost approximately \$30,000.

SALEM, ORE.—A contract has been given by the Oregon Electric, it is said, for building bridges over the Santiam river and

the Willamette river on the line between Salem, Ore., and Albany.

SEATTLE, WASH.—See Northern Pacific under Railway Construction.

SIDNEY, NEB.—The Union Pacific has let the contract to Geo. B. Swift & Co., Chicago, for building a 9-stall roundhouse to replace the structure recently destroyed by fire. (Nov. 3, p. 933.)

SIERRA MADRE, CAL.—The Pacific Electric is having plans made for a combined passenger and freight station at Sierra Madre.

SPOKANE, WASH.—The Chicago, Milwaukee & Puget Sound and the Oregon-Washington Railroad & Navigation Company have bought a strip of land a mile and a half long and 1,000 ft. wide, just east of the city limits. It is probable that the land will be used for freight terminals similar to those at Yardley, Wash.

SUMAS, WASH.—The Northern Pacific is having plans made, it is said, for a new station to be built at Sumas.

TRANSCONA, MAN.—The Grand Trunk Pacific will build a car shop plant, to include the following buildings situated on either side of a 1,200 ft. midway, which will serve both the locomotive and car shops: A wooden lumber shed 165 ft. x 60 ft. on concrete foundations, a reinforced concrete and brick dry kiln 40 ft. x 70 ft., a concrete and brick wheel and machine shop 165 ft. x 75 ft., equipped with a 20-ton electric traveling crane, a brick freight car shop 200 ft. x 600 ft., equipped with two electric traveling cranes of 10 and 20-tons capacity, a brick planing mill 100 ft. x 300 ft., a paint store house 30 ft. x 40 ft., a coach paint shop 100 ft. x 340 ft., two coach shops each 120 x 200 ft., and equipped with 70-electric transfer tables, and two office buildings each 60 ft. x 68 ft., one for the car shops and one for the locomotive shops which this company will also build at this place.

WOLFFVILLE, N. S.—The Dominion Atlantic Railway, it is said, is planning to build a brick and stone station.

WOODLAND, CAL.—The Vallejo & Northern will soon ask for bids, it is said, for putting up a station at Woodland, to cost \$15,000. Plans are now being made.

VANCOUVER, B. C.—A contract is said to have been given by the Canadian Pacific to Skene & Christie, Vancouver, for building a large hotel at Vancouver.

The Canadian Pacific, it is said, is having plans made for a new station at Vancouver.

#### FOREIGN RAILWAY NOTES.

The 40 miles, now under construction by the Guatemala Railway Company, Guatemala, from the port of La Union, Salvador, to San Miguel, will be completed in January, 1912. The line will then be extended to San Salvador, about 200 miles distant, passing through Usulután, San Vicente and Cojutepeque.

There is much interest in the completion of the line from Huancayo to Ayacucho, in central Peru, and its extension to Cuzco, since this stretch would form an integral part of the main line of the theoretical Pan-American Railway, of which the only completed sections in Peru at present are the lines. There is also a short section under construction between Chimbote and Recuay.

The latest accident report of the Russian ministry of ways and communication shows that the total number of accidents of all the Russian railways in 1908 was 20,045. This total is divided as follows: 50.7 per cent. with rolling stock in motion; 38.4 per cent., accidents on the lines not attributable to rolling stock in motion, but including loading, discharging, etc.; 10.9 per cent., accidents not directly attributed to the railway service. Nearly all the accidents resulting from rolling stock in motion affected employees. The percentage of accidents on the treasury lines under this head was higher than that on the private lines. Accidents have constantly increased since 1903, when there were only half as many as in 1908. The number of accidents to passengers showed a large increase in 1905-1906, but in the following two years there was a great decrease. On the other hand there was a large increase in accidents to employees during that period.

## Railway Financial News.

BOSTON RAILROAD HOLDING COMPANY.—This company has asked the Massachusetts railway commission for authority to issue \$239,500 preferred stock, the proceeds to be used to take up a demand note for \$239,517 which was given to pay for \$227,300 stock of the Boston & Maine.

CARTHAGE, WATERTOWN & SACKETT'S HARBOR.—See New York Central & Hudson River.

CHICAGO & ALTON.—Samuel Insull has been elected a director and a member of the executive committee, succeeding George H. Ross.

ILLINOIS SOUTHERN.—Stockholders at a special meeting have voted to approve the issue of \$3,000,000 first mortgage bonds and \$1,380,000 income bonds to refund the present first mortgage bonds taken by the clearing house committee when the Walsh banks failed.

INTERNATIONAL & GREAT NORTHERN HOLDING CO.—This company has been incorporated under the laws of Virginia with \$5,500,000 capital to act as a holding company for railway stocks and for allied purposes. Frank J. Gould has been made president. It is understood that the Holding company will be used in the reorganization of the International & Great Northern in such a way as to preserve the equity of the third mortgage bondholders of the railway company in case the Texas railway commission does not allow a greater valuation than \$30,365,000 for the I. & G. N. in Texas. The reorganization plan, as previously mentioned in these columns, calls for a valuation of \$35,457,000, and under the present ruling of the Texas commission the reorganized company would be prevented from issuing \$4,000,000 common stock preserved for exchange of third mortgage bonds of the old company and for defaulted interest coupons up to March 1, 1911. It is proposed that the Holding company buy the entire amount of common stock issuable under the commission's present property valuation, or any later valuation, and that the Holding company will issue participation certificates of beneficial interest to the full value of the common stock called for in the reorganization plan.

JAMESTOWN, CHAUTAUQUA & LAKE ERIE RAILWAY.—George Bullock, of New York, has been appointed receiver of this company and of the Jamestown & Chautauqua, and of the Chautauqua Steamship Company. The railway companies operate a line from Jamestown, N. Y., to Westfield.

MARSHALL & EAST TEXAS.—Stockholders are to vote on December 5 on the question of authorizing the issue of \$5,000,000 5 per cent. first mortgage bonds.

MINNEAPOLIS, ST. PAUL & SAULT STE. MARIE.—This company has filed a mortgage to secure \$20,000,000 Chicago Terminal 4 per cent. bonds of 1911-1941. This mortgage is given in connection with the Mortgage Terminal Company, which has been formed to buy land for and build the Soo's Chicago terminal.

NEW YORK CENTRAL & HUDSON RIVER.—The New York Public Service Commission, Second district (state), has authorized the New York Central & Hudson River to buy the outstanding 11 shares of preferred stock and 27 shares of common stock not already owned by the N. Y. C. & H. R., there being a total of 215 shares of preferred stock and 4,650 shares of common stock outstanding of the Carthage, Watertown & Sackett's Harbor, at a price not more than \$125 a share. The Carthage, Watertown & Sackett's Harbor was leased in 1872 to the Utica & Black River Railroad, which perpetual lease has been assigned to the Rome, Watertown & Ogdensburg and assumed by the New York Central & Hudson River.

ST. LOUIS, IRON MOUNTAIN & SOUTHERN.—See an item in regard to traffic agreements with the St. Louis & San Francisco in Traffic News.

ST. LOUIS & SAN FRANCISCO.—See an item in regard to traffic agreements with the Texas & Pacific in Traffic News.

TEXAS & PACIFIC.—See an item in regard to traffic agreements with the St. Louis & San Francisco in Traffic News.